DOCUMENT RESUME

ED 348 442 UD 028 802

AUTHOR Donaldson, William S.
TITLE Report of the Chapter 1 Sustained Effects Study. 1989-91. Elementary and Secondary Education Act--Chapter 1.
INSTITUTION Columbus Public Schools, OH. Dept. of Evaluation Services.
PUB DATE Jun 92
NOTE 63p.
PUB TYPE Reports - Evaluative/Feasibility (142) -- Statistical Data (110)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *Compensatory Education; Disadvantaged Youth; Economically Disadvantaged; Educationally Disadvantaged; Elementary School Students; Elementary Secondary Education; Longitudinal Studies; Low Income Groups; *Outcomes of Education; *Pretests Posttests; *Program Evaluation; Research Methodology; School Districts; Secondary School Students; Special Needs Students; Student Evaluation; *Urban Schools
IDENTIFIERS *Columbus Public Schools OH; Elementary Consolidation Improvement Act Chapter 1; *Sustaining Effects Study

ABSTRACT

This paper studies pretest-to-posttest, posttest-to-sustained effect, and pretest-to-sustained effect changes for 3,775 students in grades 2 through 8 who participated in Chapter 1 reading/mathematics programs in Columbus (Ohio) Public Schools during the 1989-90 school year. Data for 16 analysis groups were collected in spring of 1989, 1990, and 1991 and separated by skill area (reading-basic, reading-advanced, mathematics-basic, and mathematics-advanced) and by group-of-interest (exited program after 1 year, in the evaluation sample the second year, served but not in the evaluation sample the second year, and total). Those who exited the Chapter 1 program had the highest posttest scores and lost a substantial percent of their posttest-pretest gain during the year after program participation. Pretest, posttest, and sustained effects averages for reading-basic and reading-advanced were similar for grades 3 through 6. At least 50 percent of the students in each study group had positive pretest-to-sustained effect change values. The development of recommendations based solely on the sustained effects data is constrained by the complexity of how students get into the evaluation sample in various Chapter 1 programs and the types and amount of services that students receive compared to their need for services. Included are 26 graphs and 24 tables. (RLC)

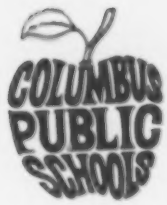
****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED348442

Elementary and Secondary Education Act - Chapter 1

REPORT OF THE CHAPTER 1 SUSTAINED EFFECTS STUDY

June 1992



"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
W.S. Donaldson
Columbus Pub. Schools
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Prepared by:

William S. Donaldson, Ed.D
Professional Specialist

Under the Supervision of:

Richard A. Amorose, Ph.D.

Columbus (Ohio) Public Schools
Department of Evaluation Services
Gary Thompson, Ph.D., Director

LB 2822.82

Elementary and Secondary Education Act - Chapter 1

REPORT OF THE CHAPTER 1 SUSTAINED EFFECTS STUDY 1989-91

ABSTRACT

Purpose of the Study

According to ESEA Chapter 1 guidelines, school districts receiving Chapter 1 funds are to conduct a study of sustained effects once every three years and use the results in planning of future Chapter 1 programs. To this end, the study addresses three research questions related to change values: a) What is the change from pretest to posttest?; b) What is the change from posttest to sustained effect?; and, c) What is the change from pretest to sustained effect?

Method

A Spring-Spring-Spring testing design was adopted. Data were collected in April of three successive years: 1989, 1990, 1991. Five eligibility criteria were used to judge whether a pupil would become a part of the dataset used for analysis purposes. Each pupil had to: a) participate in a Chapter 1 reading/math program in Columbus Public Schools during the 1989-90 school year; b) be in grade 2-8; c) be in the 1989-90 evaluation sample; d) be promoted to the next grade for the 1990-91 school year; and, e) have test scores for all three measurements. Data from these measurements were matched by student number; pupils not meeting all five criteria were eliminated from the study.

Data were partitioned by skill area (Reading-Basic; Reading-Advanced; Math-Basic; Math-Advanced), and by group-of-interest (exited program after one year; in the evaluation sample the second year; served but not in the evaluation sample the second year; total). Thus, 16 analysis groups were evaluated.

Results

Of the 6,764 Chapter 1 pupils who were proposed, 3,777 were included in the study by virtue of having met each of the five eligibility criteria. Of these, two instances of duplicate records were eliminated; 3,775 pupils remained as the analysis dataset.

Pupils who exited the Chapter 1 program had the highest posttest scores, on average. Pupils in the evaluation sample and served subsets were lower at posttesting than pupils in the exited group, and were quite similar in terms of change values. Exited pupils tended to lose more pretest-to-posttest change than did other pupils, when posttest-to-sustained effect change was evaluated. Evaluation sample and served groups (Reading-Basic) and evaluation sample (Math-Advanced), on average, actually had lower posttest scores than pretest scores.

Exited pupils in the Math-Basic subset lost more than 60% of the positive pretest-to-posttest change, when posttest-sustained effect change was evaluated. When pretest-to-sustained effect change was evaluated, all 16 study groups showed positive change; at the conclusion of the two-year measurement interval, all calculated change values of this type were positive, on average.

An assessment of individual pupil change showed that at least 50% of the pupils in each of the 16 study groups had positive pretest-to-sustained effect change values. Of pupils in the Reading-Advanced exited group, 72.7% had positive pretest-to-posttest change values.

Summary/Implications

The following implications of the study are presented for consideration by program personnel.

1. Exited groups tended to lose a substantial percent of their posttest-pretest gain during the year subsequent to their year of treatment. Given that a large percentage of the pupils in the exited groups are still eligible for Chapter 1 (using a 36th %ile cut score) at the end of their treatment year, is it possible to provide service to these pupils under Chapter 1 guidelines, what type of service do these pupils need, and is it feasible to provide these services?

   One approach to providing Chapter 1 services to exited pupils would be to differentiate service based on the school district's current method of determining eligibility [i.e., the Chapter 1 Service Index (SI)]. For example, a pupil with a SI of 40 who was in the program in year one, would remain in the program in year two, but would receive treatment two days per week, while a pupil with a SI of 20 would receive service five days a week regardless of the service received in year one. In addition to the number of days of treatment, perhaps a different type of service is needed for pupils who would exit the program under the current selection method.

2. The pretest, posttest, and sustained effects averages for Reading-Basic and Reading-Advanced look quite similar at grade levels three through six. It is recommended that further investigation be done to determine whether the criterion used to define "evaluation sample" and "served" groups needs to be revised. The present 80% attendance with respect to teacher service pattern does not seem to produce change-divergent groups. Under the assumption that change is directly related to days of attendance, perhaps it would be productive to consider another threshold value in the area of reading.

3. The development of definitive recommendations based solely on the sustained effects data is constrained by the complexity of how a pupil gets into the evaluation sample in the various Chapter 1 programs and the type and amount of service a pupil actually receives relative to the pupil's need for service. In these areas input from program personnel is essential in the development of definitive recommendations.

REPORT OF THE CHAPTER 1 SUSTAINED EFFECTS STUDY

June 1992

Introduction

ESEA Chapter 1 evaluation guidelines require school districts receiving Chapter 1 funds to conduct a study of the sustained effects (SES) of Chapter 1 programs. The study is to be conducted once every three years and the results are to be used in the planning of Chapter 1 programs.

This study examined the effect of Chapter 1 service on four skill areas: Total Reading (TR, basic), Reading Comprehension (RC, advanced), Total Math (TM, basic), and Math Concepts and Applications (MA, advanced). This examination used a Spring - Spring - Spring testing design: pretest 4/89, posttest 4/90, and sustained effects 4/92. Primary emphasis was given to determining the extent to which the reading and math effects obtained by pupils in the 1989-90 Chapter 1 Evaluation Sample (i.e., study-eligible pupils) were sustained during the 1990-91 school year. Use of this design made possible identification of Chapter 1 pupils in terms of pretest/posttest change, posttest/sustained effects change, and pretest/sustained effects change.

Within each of the four skill areas of Chapter 1 instruction, four groups of study-eligible pupils were evaluated: not served by Chapter 1 in 1990-91 (exited pupils), in the 1990-91 evaluation sample, served but not in the 1990-91 evaluation sample, and total (sum of the three groups). Results are presented by 1989-90 grade levels (grade 2-8).

In this context, this study addressed three research questions:

a. What effect did service have on achievement level pretest (4/89) to posttest (4/90)?

b. What achievement-level sustained effect was observed posttest (4/90) to sustained effect (4/91)?

c. What net-effect achievement level was observed pretest (4/89) to sustained effect (4/91)?

Method

Study Eligibility

Five criteria were used to select 1989-90 Chapter 1 pupils for analysis. To be included in the study, a pupil had to meet each of these criteria:

1. The pupil was served in either a Chapter 1 reading or mathematics program in a Columbus Public Schools during the 1989-90 school year. Nonpublic program pupils were not included in the study due to the small number of these pupils and the fact that their test results indicated that, as a group, they are not typical of the public school group.

2. The pupil was in grades 2-8 during the 1989-90 school year. Pupils in grades K-1 were not included because they were not tested on the requisite 12-month basis.

3. The pupil was in the 1989-90 evaluation sample by virtue of having valid pretest/posttest scores and meeting one of the following attendance criteria: for all reading programs, except CLEAR Elementary CAI (see Table 2), attended at least 80% of the possible program days; for math programs and CLEAR Elementary CAI, enrolled at least 30 days and attended at least 80% of the pupil's enrollment days. A pupil could be in the basic skills sample, the advanced skills sample, or both.

4. The pupil was promoted to the next grade for the 1990-91 school year. This follows Chapter 1 evaluation procedure for pretest/posttest analysis and allows for a more meaningful interpretation of results.

5. The pupil had test scores for all three testing periods (Spring 1989, Spring 1990, Spring 1991).

The data file for 1989-90 Chapter 1 service (see eligibility criterion #1) contained a total of 6,764 potential cases for the study. Application of the five selection criteria produced the included pupils displayed in Table 1. The four observed groups are arrayed to show membership by instructional area (reading or math) and skills area (basic or advanced). For example, the Table 1 "Total" row shows the number of pupils per instructional and skill area. There were 2,156 pupils who were selected by the five criteria for the Reading-Basic group. There were 1,177 pupils who were in the exited group, Reading-Basic. The test series and subtests that were used to measure basic and advanced skills are given in the next section.

Table 1

Sustained Effects Study
Pupil Counts by Observed Group and Test Area
After Selection Criteria were Applied

Observed Group[a]	Area			
	Reading		Math	
	Basic	Advanced	Basic	Advanced
Exited	1,177	1,103	585	583
In 1990-91 Evaluation Sample	497	456	320	321
Served (not in sample)	482	501	52	50
Total	2,156	2,060	957	954

[a] Group definition: Exited - in the 1989-90 Evaluation Sample but not served in the 1990-91 program.

Evaluation Sample - in the 1989-90 Evaluation Sample and in the 1990-91 Evaluation Sample.

Served - in the 1989-90 Evaluation Sample, served in 1990-91, but not in the 1990-91 Evaluation Sample.

Total - the sum of Exited, Evaluation Sample and Served.

Table 2 shows the number of pupils in this study by program name. Note that none of the 1990-91 Early Literacy students met all five selection criteria. Counts for 1990-91 do not include exited pupils.

Test Instruments

Chapter 1 pupils were administered test instruments as described in Table 3. With the exception of the 1989-90 second graders, all pupils took the grade and time-of-year appropriate tests of the Comprehensive Test of Basic Skills (CTBS:CTB/McGraw-Hill, 1981). The 1989-90 second graders took the grade and time-of-year appropriate tests of the Metropolitan Achievement Tests (MAT6: The Psychological Corporation, 1985, 6th ed.) as a pretest and posttest. However, these pupils took a CTBS as their sustained effects tests in April 1991.

Subtests used to measure the basic and advanced skills areas for grades 3-8 are as follows: Reading-Basic (RB) = Total Reading (Reading Vocabulary plus Reading Comprehension); Reading-Advanced (RA) = Reading Comprehension; Math-Basic (MB) = Total Math (Math Computation plus Math Concepts and Applications); Math-Advanced (MA) = Math Concepts and Applications. For the MAT6 used at grade 2, Word Recognition Skills is added to Vocabulary and Reading Comprehension to make up Total Reading.

Table 2

Sustained Effects Study
Pupil Counts by Year and Project Code
for Pupils Meeting All Five Selection Criteria

Year 1989-90				Year 1990-91			
Program Name	Code	Grades	Count	Program Name	Code	Grades	Count
CLEAR Whole Language	90003	2-5	518	Reading Elementary	91004	2-5	617
CLEAR Elementary	90004	2-5	423	Reading Middle	91014	6-8	454
CLEAR Middle	90006	6-8	447	Math Elementary	91005	3-5	204
CLEAR Elementary CAI	90204	3-5	680	Math Middle	91015	6-8	205
CLEAR Middle CAI	90206	6-8	197	Early Literacy	91396	2	0
MIC Elementary CAI	90005	3-5	475				
MIC Elementary CBE	90015	3-5	253				
MIC Middle CAI	90215	6-8	283				
Total			3,276				1,480

Table 3

Sustained Effects Study
Test Level and Form

1989-90 Treatment Grade	1990-91 Sustained Effect	4-89 Pretest Test/Level/Form	4-90 Posttest Test/Level/Form	4-91 Sustained Effect Test/Level/Form
2	3	MAT6 Primer L	MAT6 Primary 1 L	CTBS E V
3	4	CTBS D V*	CTBS E V	CTBS F V
4	5	CTBS E V	CTBS F V	CTBS G V
5	6	CTBS F V*	CTBS G V	CTBS G V
6	7	CTBS G V	CTBS G V	CTBS H V
7	8	CTBS G V	CTBS H V*	CTBS H V
8	9	CTBS H V*	CTBS H V	CTBS J V

* An abridged version of the test was used. The abridged version which was developed by the test vendor using item response theory, contained approximately 22 test items for each subtest.

Procedure

Three data files were analyzed in this study. Two of these were compensatory education Program Involvement Files (PIF: 1989-90, PIF: 1990-91). The third data file used was the April 1991 districtwide testing file (DW) maintained by the Columbus Public Schools.

The 1989-90 PIF was the basis for determining the pupils who met the first three eligibility criteria listed in the Method Section. Records for pupils who met the first three eligibility criteria were matched by student number to the 1990-91 PIF to determine Chapter 1 service status, grade promotion status, and sustained effects test scores. Finally, records for pupils who met the first three criteria, but were not on the 1990-91 PIF were matched by student number to the DW file to determine grade promotion status and sustained effects scores. By matching the files in the way described above, it was possible to identify and keep for further analysis only those pupil records who met all five eligibility criteria. The resulting subset of 1989-90 PIF records were partitioned into 16 separate datasets according to group membership (see Table 4).

All data analyses were conducted using software code written in SAS (Statistical Analysis System, V.6.06). Each of the sixteen groups was processed to produce graphs and tables for each grade level involved in the study. For example, Figure 1, "Reading-Basic (Total Reading)", uses grade 2 data from Tables 5-8. Figures 1-7 use data from Tables 5-8; Figures 8-14 use data from Tables 9-12; Figures 15-20 use data from Tables 13-16; and Figures 21-26 use data from Tables 17-20.

Table 4

Sustained Effects Study
Analysis Groups[a]

Group	N		Description
EXITRB	1,117	-	Exited, Reading-Basic (RB)
EVSAMPRB	497	-	Evaluation Sample, Reading-Basic (RB)
SERVEDRB	482	-	Served-not-in-Sample, Reading-Basic (RB)
TOTALRB	2,156	-	Sum of EXITRB, EVSAMPRB and SERVED (RB)
EXITRA	1,103	-	Exited, Reading-Advanced (RA)
EVSAMPRA	456	-	Evaluation Sample, Reading-Advanced (RA)
SERVEDRA	501	-	Served-not-in-Sample, Reading-Advanced (RA)
TOTALRA	2,060	-	Sum of EXITRA, EVSAMPRA and SERVEDRA (RA)
EXITMB	585	-	Exited, Math-Basic (MB)
EVSAMPMB	320	-	Evaluation Sample, Math-Basic (MB)
SERVEDMB	52	-	Served-not-in-Sample, Math-Basic (MB)
TOTALMB	957	-	Sum of EXITMB, EVSAMPMB and SERVEDMB (MB)
EXITMA	583	-	Exited, Math-Advanced (MA)
EVSAMPMA	321	-	Evaluation Sample, Math-Advanced (MA)
SERVEDMA	50	-	Served-not-in-Sample, Math-Advanced (MA)
TOTALMA	954	-	Sum of EXITMA, EVSAMPMA and SERVEDMA (MA)

[a] Math Basic and Math Advanced were not tested at grade 2.

Eighth-Grade Data. Pupils enrolled as eighth graders during the 1989-90 year did not have a Chapter 1 program to go to as ninth graders (1990-91 year). Therefore, these pupils were exited from the program, and their respective figures show only one curve (exited and total are identical). Corresponding tabular data for eighth graders show "0" entries for evaluation sample and served.

Pupil Counts. Each of the 16 major datasets consists of at least 50 pupils. However, for example, when the "served" group for Math-Advanced is split by grade level, pupil count becomes less than 10 in certain instances. Conclusions made based on figures for these low-count subsets should be tempered accordingly.

Test/Level/Form Considerations. Second-grade pupils were pretested with MAT6/Primer L, posttested with MAT6/Primary 1 L, with sustained effects scores from CTBS/E V. Therefore, extreme caution should be used in interpreting grade 2 results. Complete test/level/form information is contained in Table 3.

Results

The following figures (1-26) and tables (5-20) report grade level findings. Except for grade eight figures which show one curve (exited and total are identical), each figure shows four curves: Exited, Evaluation Sample, Served-not-in-Sample, and Total. The legend below each figure associates the symbol used at each measurement point with a particular curve on the graph. Tabular data by the same areas is associated by name with each figure.

Change values are presented in the narrative below each figure. Pretest/posttest change and posttest/sustained effects change are reported. Tabularly, posttest minus pretest change is labeled "POS-PRE". Sustained effect minus posttest is represented by "SE-POS".

NCE Change

Posttest minus pretest, sustained effect minus posttest and sustained effect minus pretest analyses were completed. The results which are described below are depicted in graphical form in Figures 1-26.

Posttest-Pretest. Using the 4/90 value as posttest and the 4/89 value as pretest, the average change value was computed for each of the 16 major groups in the study. Table 21 shows this "treatment" effect. All exited groups, as expected, had change values--positive--greater than 10 NCE points, as did Math-Basic.

Evaluation sample groups had modest gains (RA, MB) or negative values (RB, MA). Served groups looked much like evaluation sample groups: modest (RA, MB, MA) or negative change (RB).

Total groups (most influenced by the exited group) change values are all positive, but only the TOTALMB group approximates change as was observed for the exited groups.

Sustained Effect-Posttest. Short-term sustained effect (SE) change was evaluated by using the 4/91 SE value minus the 4/90 posttest value. Table 22 shows this "short-term" retention effect. All four exit groups have negative change values, the most significant being the MB = -10.28; i.e., from posttest to SE measurement over 10 NCE points were lost with respect to Math-Basic.

Evaluation sample groups all had positive change values (i.e., relatively, these groups "grew" during the second year of treatment. The same was true for all four served groups. Regarding total groups, all four had negative change values, due to the exited group influence.

Sustained Effect-Pretest. Table 23 presents the results for "long-term" retention effect, where the change value was calculated by subtracting the 4/89 pretest value from the 4/91 sustained effect value. All calculated change values reported in Table 23 are positive; i.e., regardless of study group membership, across the two-year interval NCE change was positive.

The exited groups had the highest change values: RB = 7.38, RA = 8.88, MB = 6.54, and MA = 5.02. For the two reading skill areas, served groups had larger change values than did evaluation sample groups. The opposite was true for the math skill areas.

Individual Pupil Change

Of interest is the percent of each of the 16 study groups that had positive change values for each of the three major research questions. Table 24 is a summary of this information.

From this table it is evident that "exit" groups are most likely to show severe drop-off, comparing posttest-pretest to sustained effect-posttest change. For example, the exited group in the Math-Basic skill area for posttest-pretest showed 92.6% of the pupils with positive change. But for sustained effect-posttest, this value dropped to 19.7% positive change. Or, of the 585 pupils in this group, only about 115 scored higher on the 4/91 measurement than on the 4/90 measurement.

In contrast, the evaluation sample groups increased the percent in each instance. The served groups increased for the two reading groups but not for the two math groups.

Positive change percents for sustained effects-pretest observations range from a low of 50.0 (served MA) to a high of 72.7 (exited RA). At the conclusion of the study interval 50% or more of all 16 groups examined did have positive change values.

Discussion

Application of the five eligibility criteria to the 1989-90 PIF dataset (N=6,764) produced an analysis dataset with 2,654 reading cases and 1,121 math cases. Thus, all analysis cases were: (a) on the 1989-90 PIF file; (b) in grades 2-8 during the 1989-90 school year; (c) in the 1989-90 evaluation sample; (d) promoted to the next grade for the 1990-91 school year; and (e) had test scores for all three measurement periods (4/89, 4/90, and 4/91).

The majority of pupils in this study became members of exited groups [Reading-Basic (RB): 1,177 (55%); Reading-Advanced (RA): 1,103 (54%); Math-Basic (MB): 585 (61%); and Math-Advanced (MA): 583 (61%)]. Therefore, "total" statistics reported are weighted toward "exit" statistics. Because this is true, recognizing that exited groups do not receive second-year treatment, it is not surprising that total groups show a second-year NCE decline similar to that observed for exited groups, nor is it remarkable that exit groups themselves exhibit a marked second-year decline.

Exited groups, by definition, had the highest posttest-pretest positive change, greater than 10 NCE units in all cases: RB = 10.74; RA = 12.94; MB = 16.81; MA = 11.65. Exited groups also had the most negative sustained effect-posttest change: RB= -3.36; RA= -4.06; MB= -10.28; MA= -6.63; e.g., about 61% of the MB change pretest to posttest disappeared posttest to sustained effect.

On the other hand, both evaluation sample and served groups showed positive change during the second year of treatment. Although change for these groups is not as impressive as for exited groups, positive change does appear to be realistic and particularly likely during the second treatment year.

The comparison of pretest and sustained-effect change reinforces this notion. The net effect of treatment across two school years is positive for each of the 16 analysis groups (sustained effects scores are--on average--higher than pretest scores). Again, exited groups have the higher change values but positive effect is evident for all groups. Consider that pupils who were selected service in the second year of the study, scored low on the posttest for the previous year. First-year change (pretest to posttest) showed negative values for the evaluation sample group in Reading-Basic (-0.48) and Math-Advanced (-1.31), and for the served group for Reading-Basic.

Regarding change at the individual pupil level, pretest to sustained effect, more than one-half had change values greater than zero for all 16 analysis groups. Over 72% of the exited group in Reading-Advanced pupils did so. And, over 70% of the exited group in Reading-Basic had change values of this type greater than zero.

Summary/Implications

The Columbus Public Schools completed the sustained-effects study in accordance with the Chapter 1 federal guidelines. The result of this study will be used in planning Chapter 1 programs in future years.

The following implications of the study are presented for consideration by program personnel.

1. Exited groups tended to lose a substantial percent of their posttest-pretest gain during the year subsequent to their year of treatment. Given that a large percentage of the pupils in the exited groups are still eligible for Chapter 1 (using a 36th %ile cut score) at the end of their treatment year, is it possible to provide service to these pupils under Chapter 1 guidelines, what type of service do these pupils need, and is it feasible to provide these services?

   One approach to providing Chapter 1 services to exited pupils would be to differentiate service based on the school district's current method of determining eligibility [i.e., the Chapter 1 Service Index (SI)]. For example, a pupil with a SI of 40 who was in the program in year one, would remain in the program in year two, but would receive treatment two days per week, while a pupil with a SI of 20 would receive service five days a week regardless of the service received in year one. In addition to the number of days of treatment, perhaps a different type of service is needed for pupils who would exit the program under the current selection method.

2. The pretest, posttest, and sustained effects averages for Reading-Basic and Reading-Advanced look quite similar at grade levels three through six. It is recommended that further investigation be used to determine whether the criterion used to define "evaluation sample" and "served" groups needs to be revised. The present 80% attendance with respect to teacher service pattern does not seem to produce change-divergent groups. Under the assumption that change is directly related to days of attendance, perhaps it would be productive to consider another threshold value in the area of reading.

   It is recommended that further investigation be done to determine whether the criterion used to define "evaluation sample" and "served" groups needs to be revised. The present 80% attendance with respect to teacher service pattern does not seem to produce change-divergent groups. Under the assumption that change is directly related to days of attendance, perhaps it would be productive to consider another threshold value in the area of reading.

3. The development of definitive recommendations based solely on the sustained effects data is constrained by the complexity of how a pupil gets into the evaluation sample in the various Chapter 1 programs and the type and amount of service a pupil actually receives relative to the pupil's need for service. In these areas input from program personnel is essential in the development of definitive recommendations.

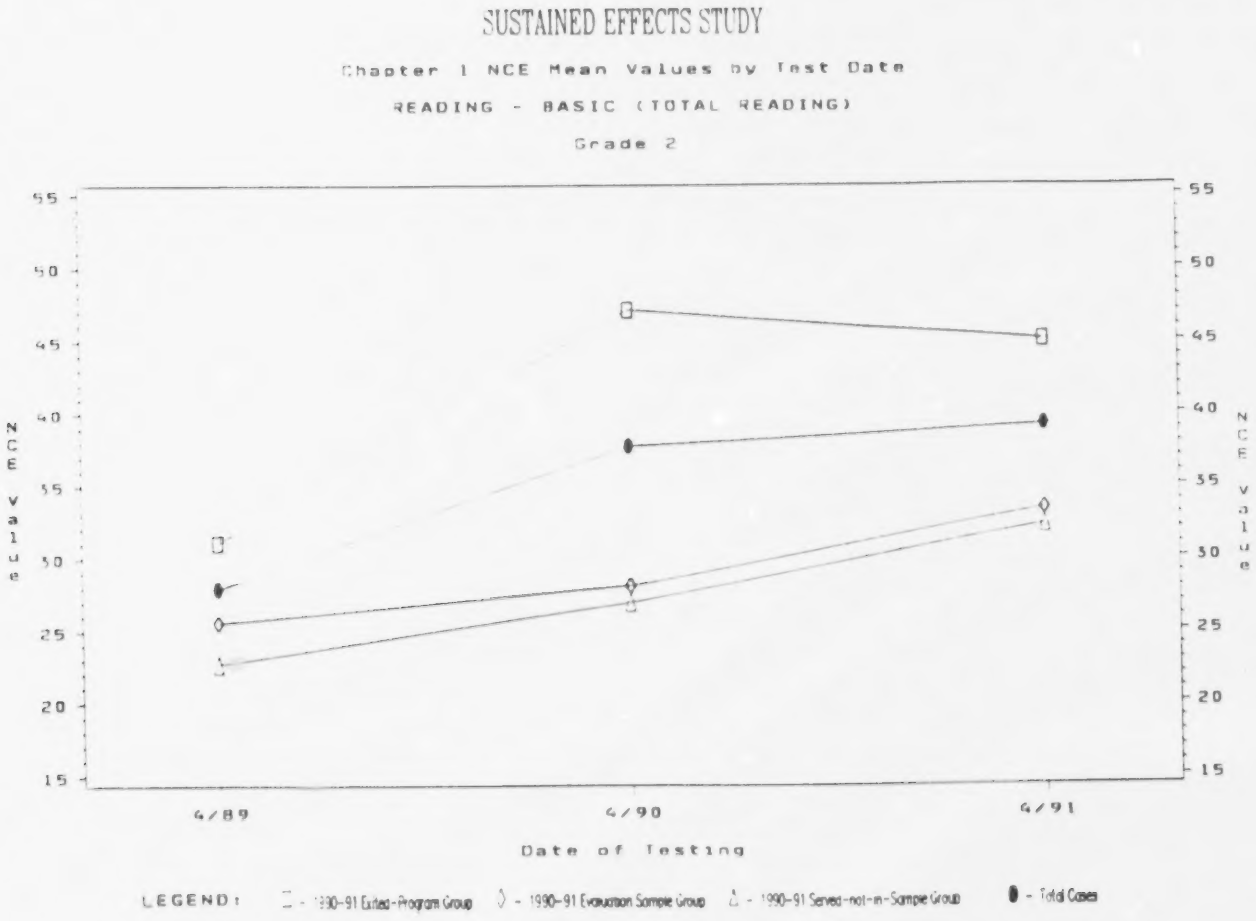


Figure 1. Average NCE for Total Reading pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for second-graders in the 1989-90 Chapter 1 Evaluation Sample.

The average pretest-posttest change in Total Reading for the four groups of pupils was: exited 16.1 (248), evaluation sample 2.5 (143), served 4.3 (86), and total 9.9 (477). The average posttest-sustained effects change for the four groups of pupils was: exited -2.1 (248), evaluation sample 5.3 (143), served 5.3 (86), and total 1.5 (477). The number of pupils appears in parentheses.

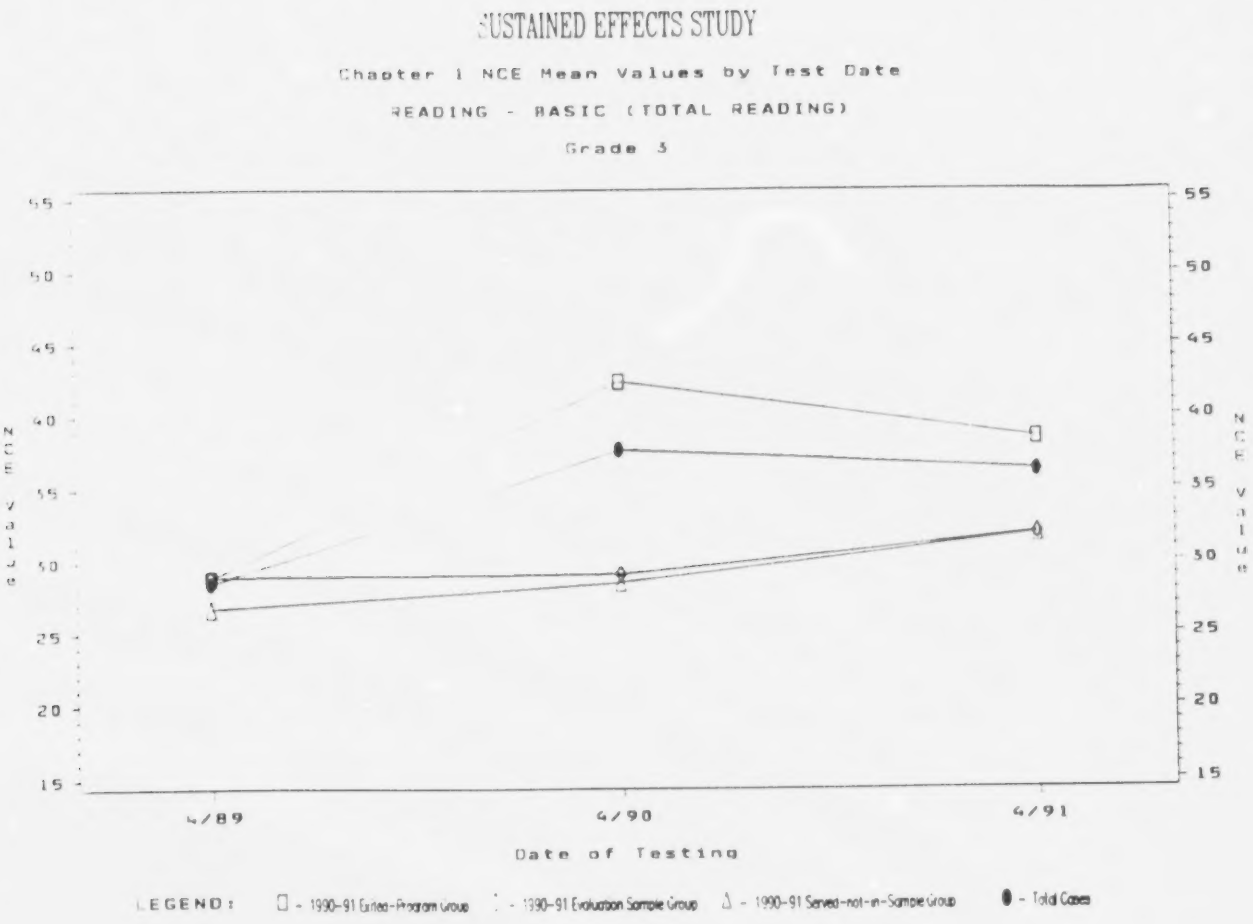


Figure 2. Average NCE for Total Reading pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for third-graders in the 1989-90 Chapter 1 Evaluation Sample.

The average pretest-posttest change in Total Reading for the four groups of pupils was: exited 13.5 (320), evaluation sample 0.2 (78), served 1.8 (90), and total 9.2 (488). The average posttest-sustained effects change for the four groups of pupils was: exited -3.9 (320), evaluation sample 2.8 (78), served 3.3 (90), and total -1.5 (488). The number of pupils appears in parentheses.

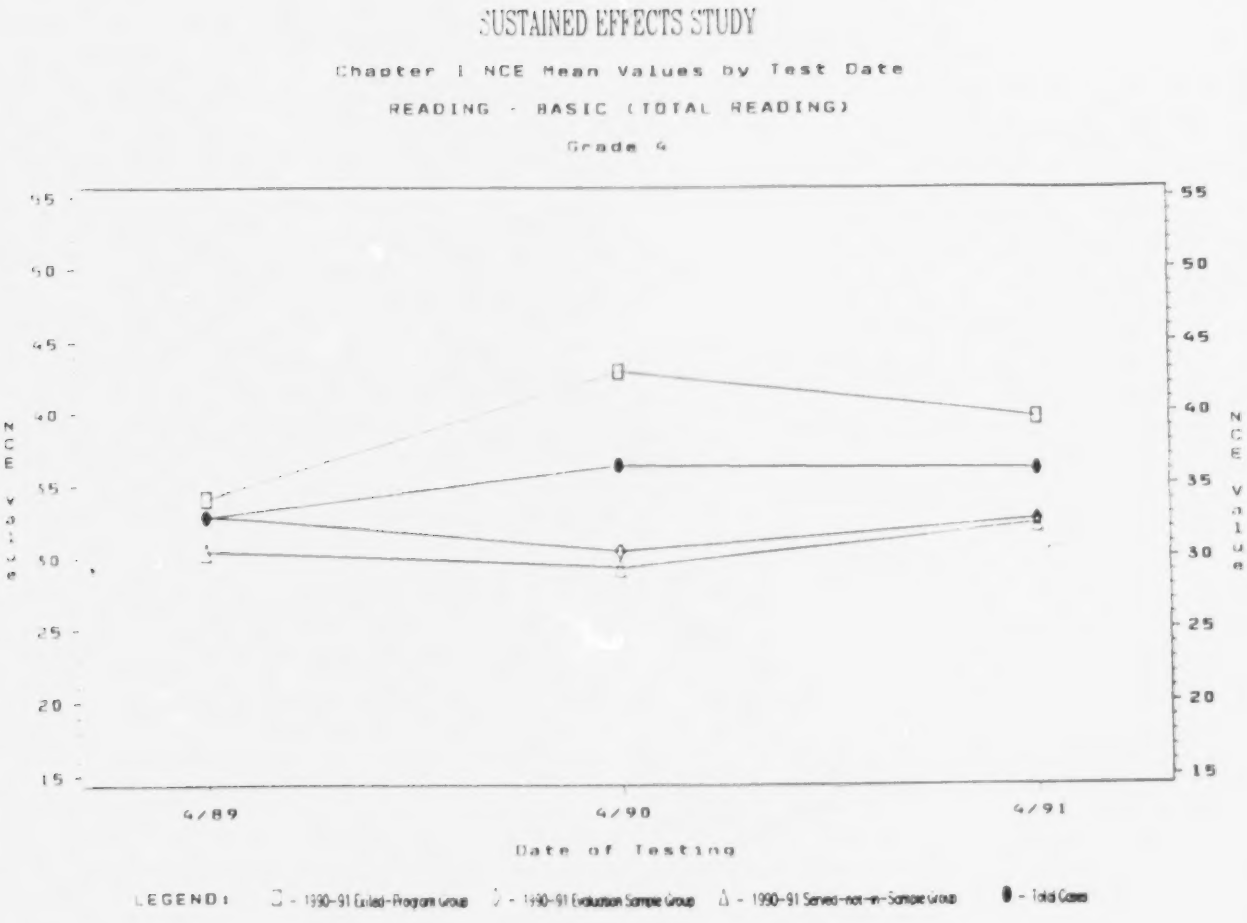


Figure 3. Average NCE for Total Reading pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for fourth-graders in the 1989-90 Chapter 1 Evaluation Sample.

The average pretest-posttest change in Total Reading for the four groups of pupils was: exited 8.8 (166), evaluation sample -2.5 (75), served -1.1 (90), and total 3.6 (331). The average posttest-sustained effects change for the four groups of pupils was: exited -3.2 (166), evaluation sample 2.2 (75), served 3.1 (90), and total -0.3 (331). The number of pupils appears in parentheses.

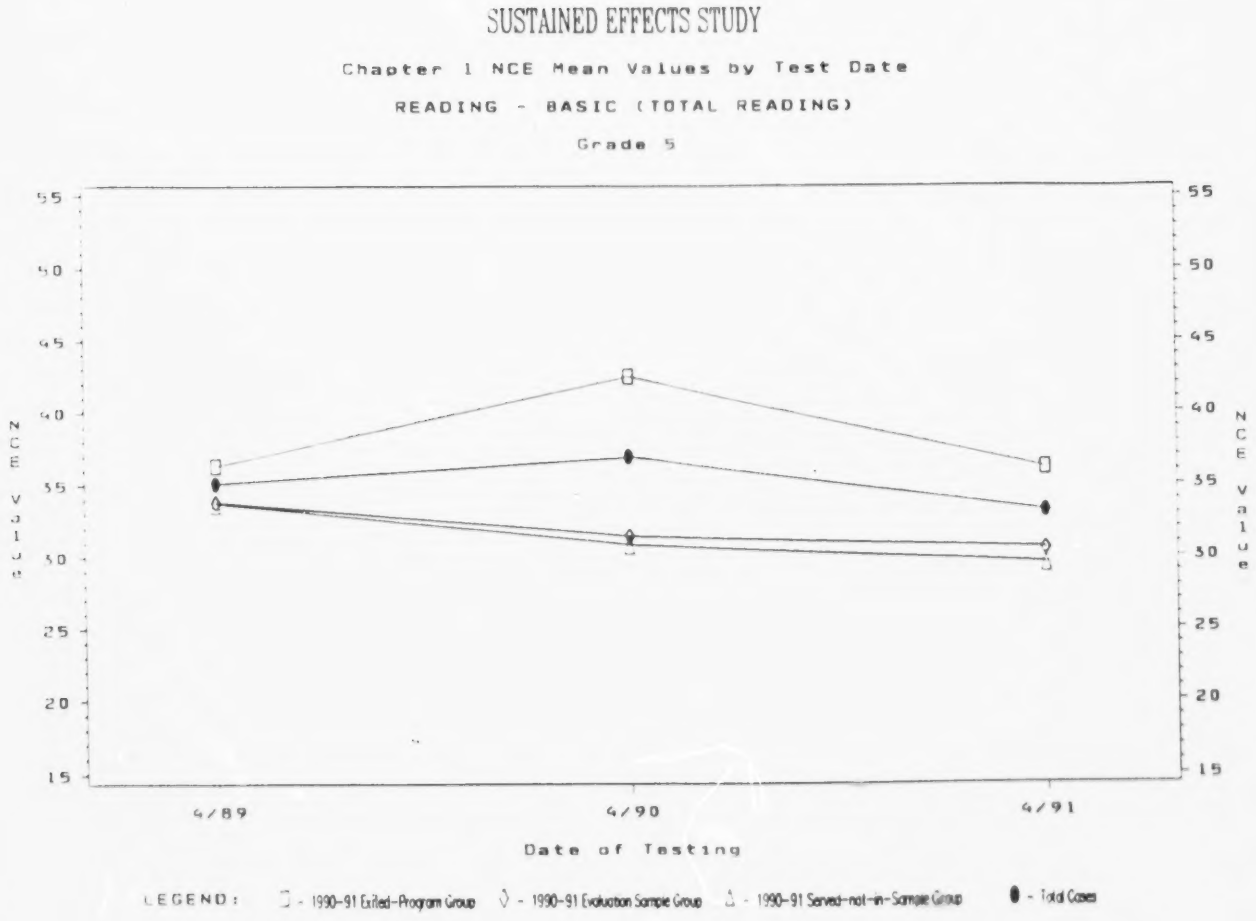


Figure 4. Average NCE for Total Reading pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for fifth-graders in the 1989-90 Chapter 1 Evaluation Sample.

The average pretest-posttest change in Total Reading for the four groups of pupils was: exited 6.1 (126), evaluation sample -2.4 (59), served -2.9 (61), and total 1.8 (246). The average posttest-sustained effects change for the four groups of pupils was: exited -6.3 (126), evaluation sample -0.9 (59), served -1.3 (61), and total -3.8 (246). The number of pupils appears in parentheses.

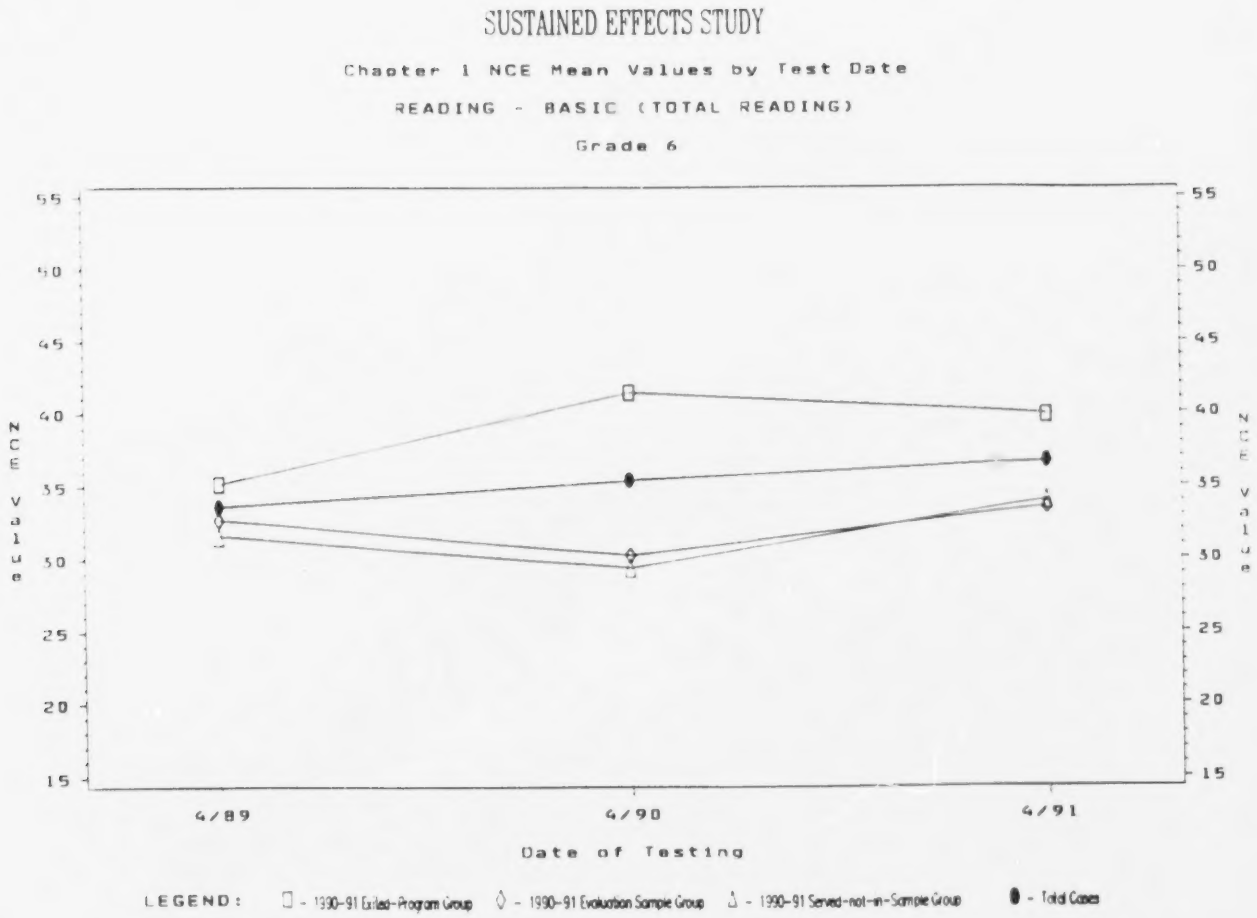


Figure 5. Average NCE for Total Reading pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for sixth-graders in the 1989-90 Chapter 1 Evaluation Sample.

The average pretest-posttest change in Total Reading for the four groups of pupils was: exited 6.2 (260), evaluation sample -2.5 (134), served -2.2 (142), and total 1.8 (536). The average posttest-sustained effects change for the four groups of pupils was: exited -1.6 (260), evaluation sample 3.3 (134), served 4.6 (142), and total 1.3 (536). The number of pupils appears in parentheses.

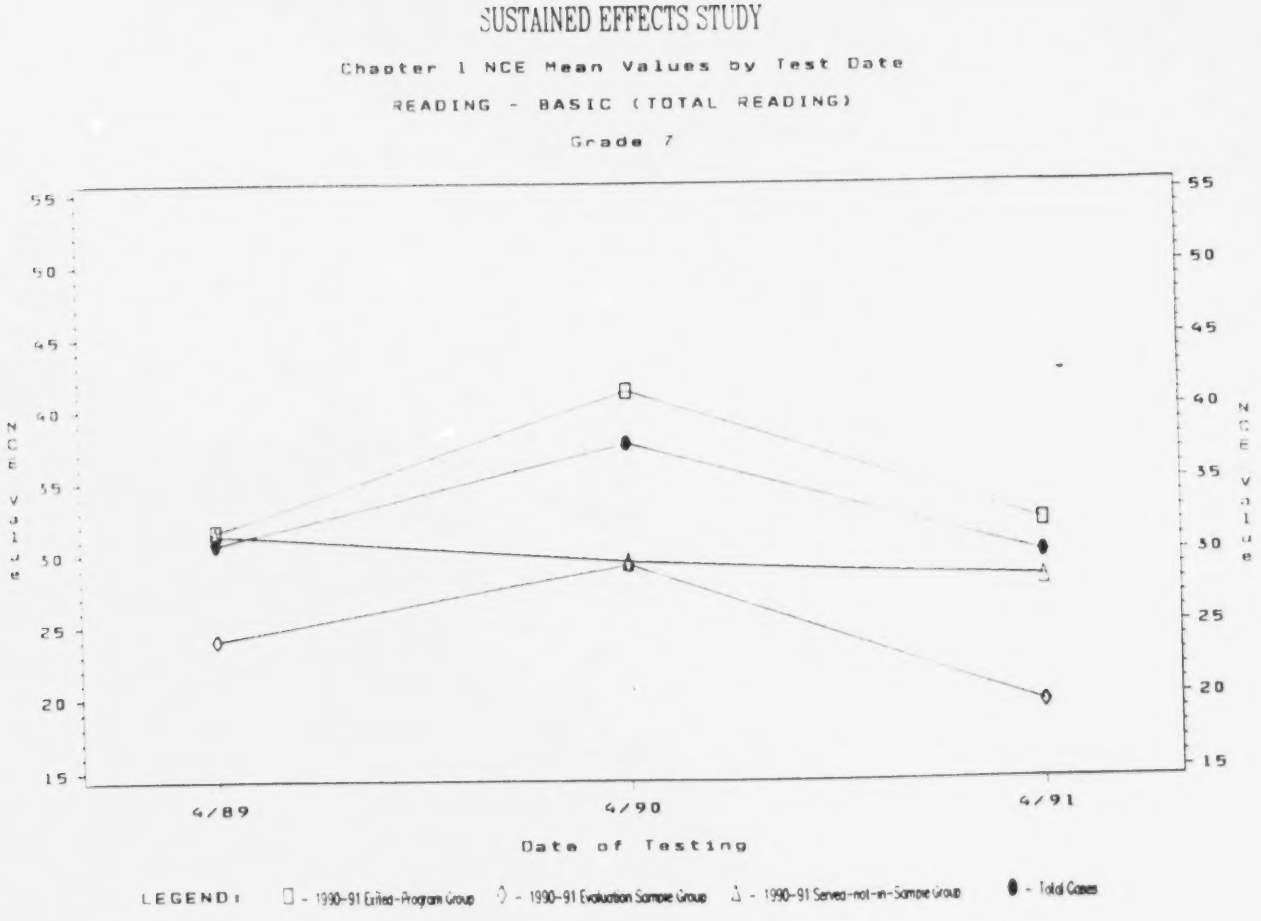


Figure 6. Average NCE for Total Reading pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for seventh-graders in the 1989-90 Chapter 1 Evaluation Sample.

The average pretest-posttest change in Total Reading for the four groups of pupils was: exited 9.6 (48), evaluation sample 5.3 (8), served -1.8 (13), and total 7.0 (69). The average posttest-sustained effects change for the four groups of pupils was: exited -9.1 (48), evaluation sample -9.8 (8), served -1.2 (13), and total -7.7 (69). The number of pupils appears in parentheses.

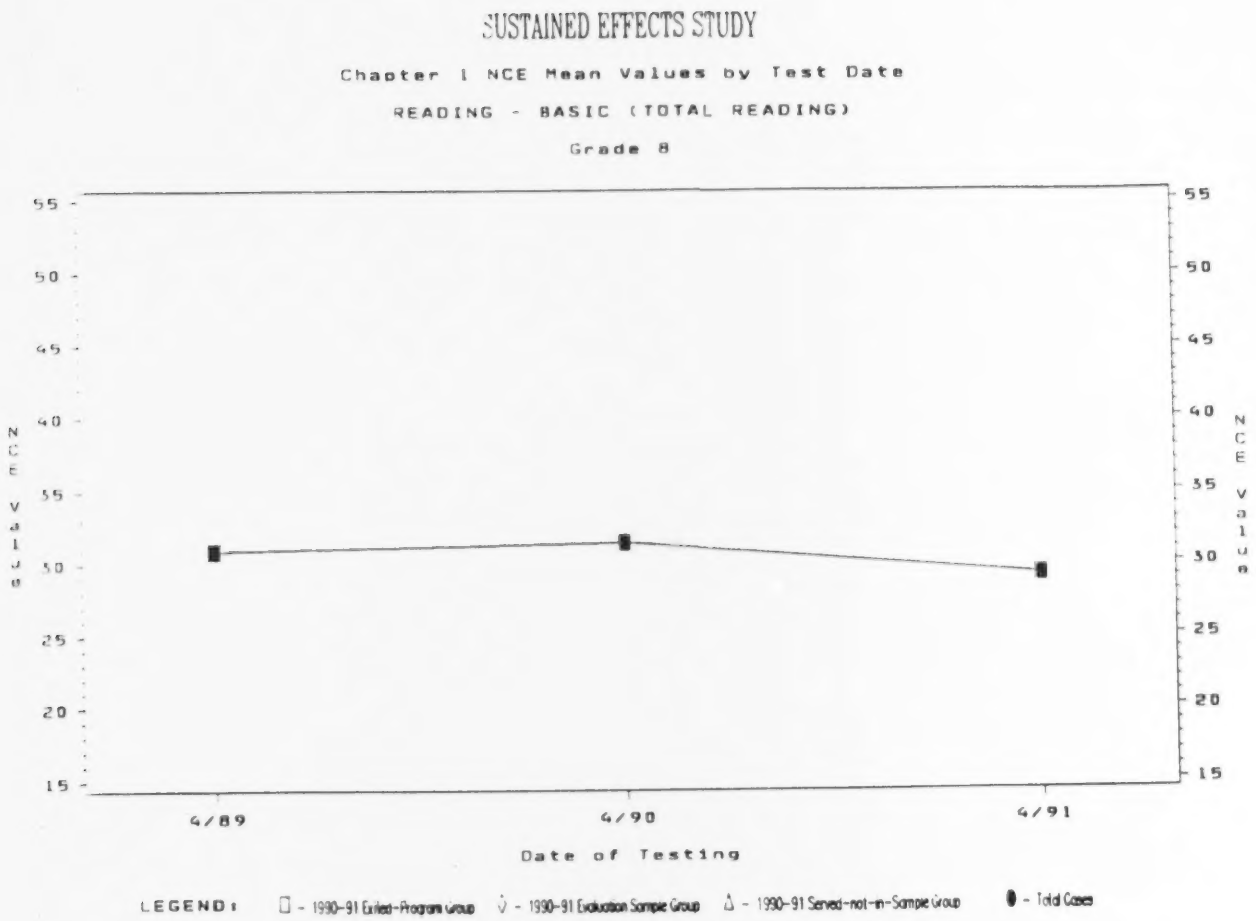


Figure 7. Average NCE for Total Reading pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for eighth-graders in the 1989-90 Chapter 1 Evaluation Sample.

Eighth-grade pupils in the 1989-90 Chapter 1 evaluation sample did not have a program available to them as ninth-graders; therefore, the two groups that appear in the graph, exited and total, are the same pupils.

The average pretest-posttest change in Total Reading for the pupils was: 0.6 (9). The average posttest-sustained effects change for the pupils was: -2.2 (9). The number of pupils appears in parentheses.

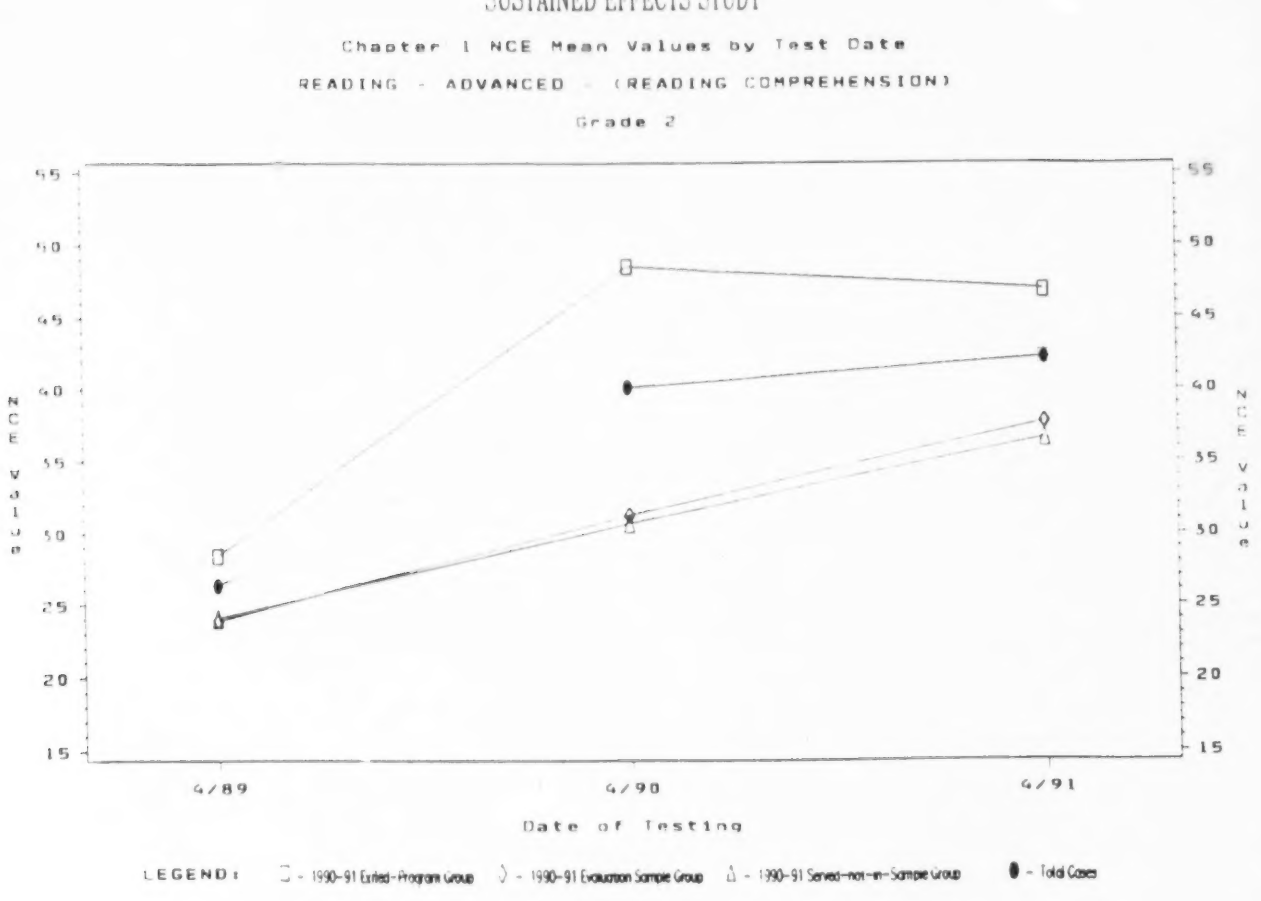


Figure 8. Average NCE for Reading Comprehension pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for second-graders in the 1989-90 Chapter 1 Evaluation Sample.

The average pretest-posttest change in Reading Comprehension for the four groups of pupils was: exited 20.0 (255), evaluation sample 7.4 (115), served 6.7 (117), and total 13.8 (487). The average posttest-sustained effects change for the four groups of pupils was: exited -1.7 (255), evaluation sample 6.4 (115), served 5.8 (117), and total 2.0 (487). The number of pupils appears in parentheses.

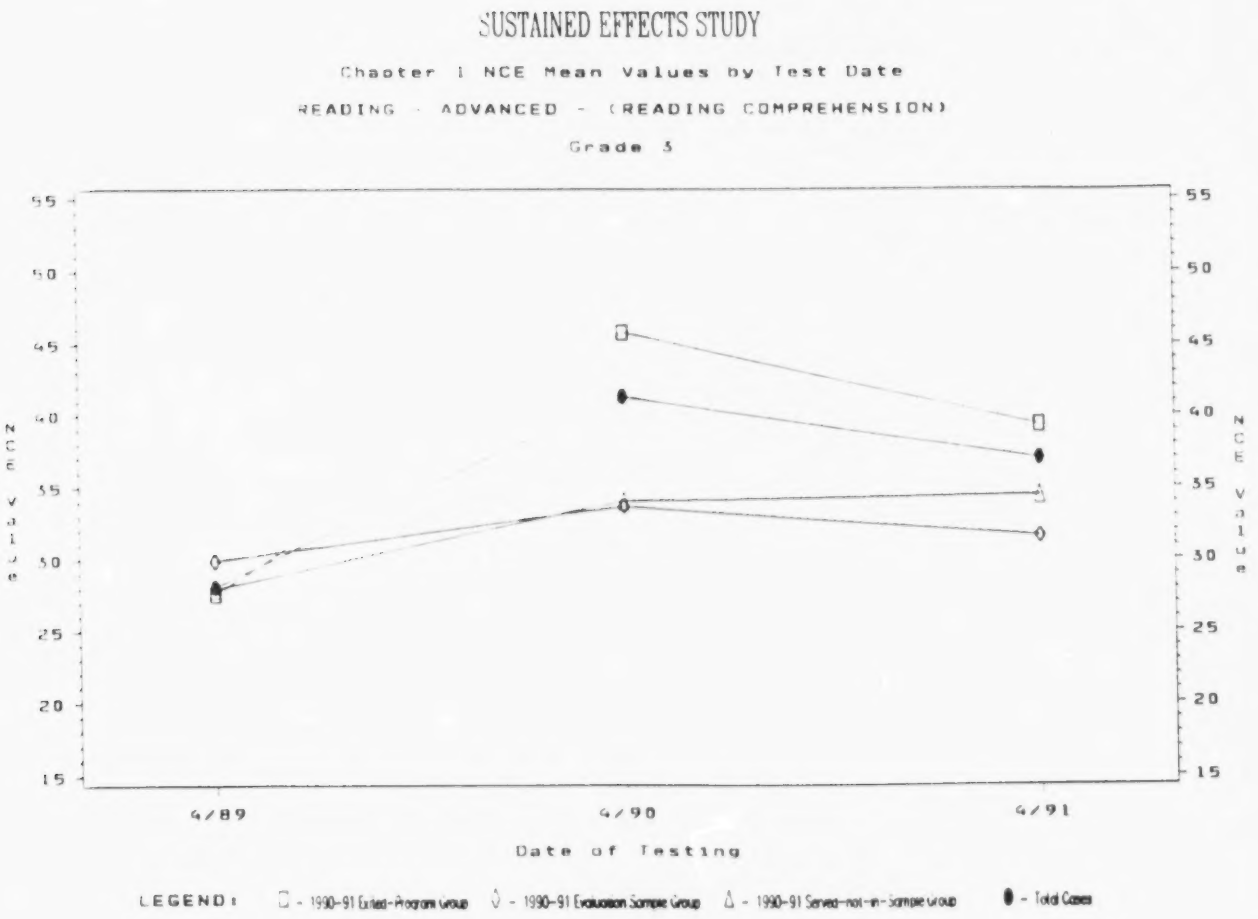


Figure 9. Average NCE for Reading Comprehension pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for third-graders in the 1989-90 Chapter 1 Evaluation Sample.

The average pretest-posttest change in Reading Comprehension for the four groups of pupils was: exited 18.2 (243), evaluation sample 3.8 (69), served 6.1 (77), and total 13.2 (389). The average posttest-sustained effects change for the four groups of pupils was: exited -6.4 (243), evaluation sample -2.1 (69), served 0.4 (77), and total -4.3 (389). The number of pupils appears in parentheses.

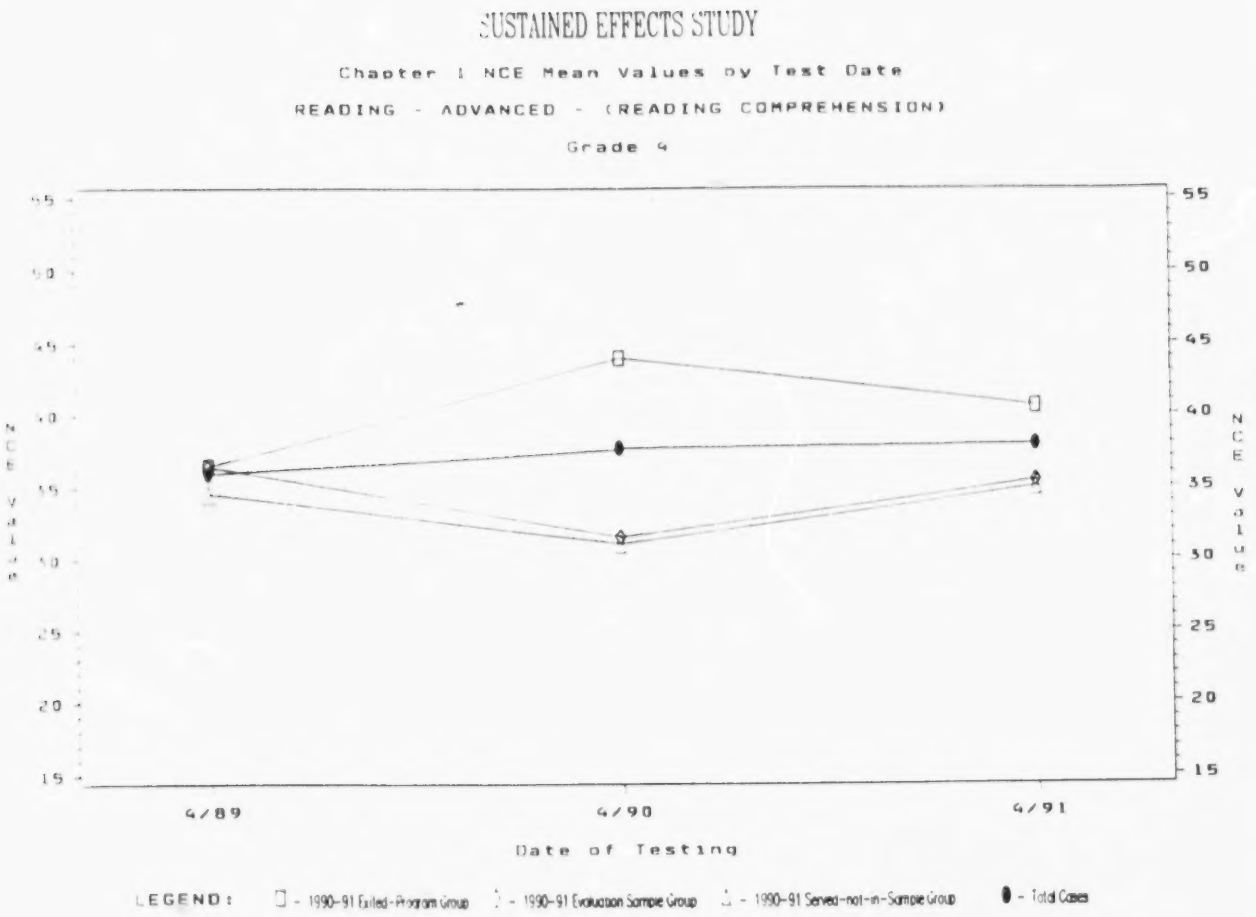


Figure 10. Average NCE for Reading Comprehension pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for fourth-graders in the 1989-90 Chapter 1 Evaluation Sample.

The average pretest-posttest change in Reading Comprehension for the four groups of pupils was: exited 7.5 (168), evaluation sample -4.8 (75), served -3.4 (90), and total 1.8 (333). The average posttest-sustained effects change for the four groups of pupils was: exited -3.4 (168), evaluation sample 3.9 (75), served 3.9 (90), and total 0.2 (333). The number of pupils appears in parentheses.

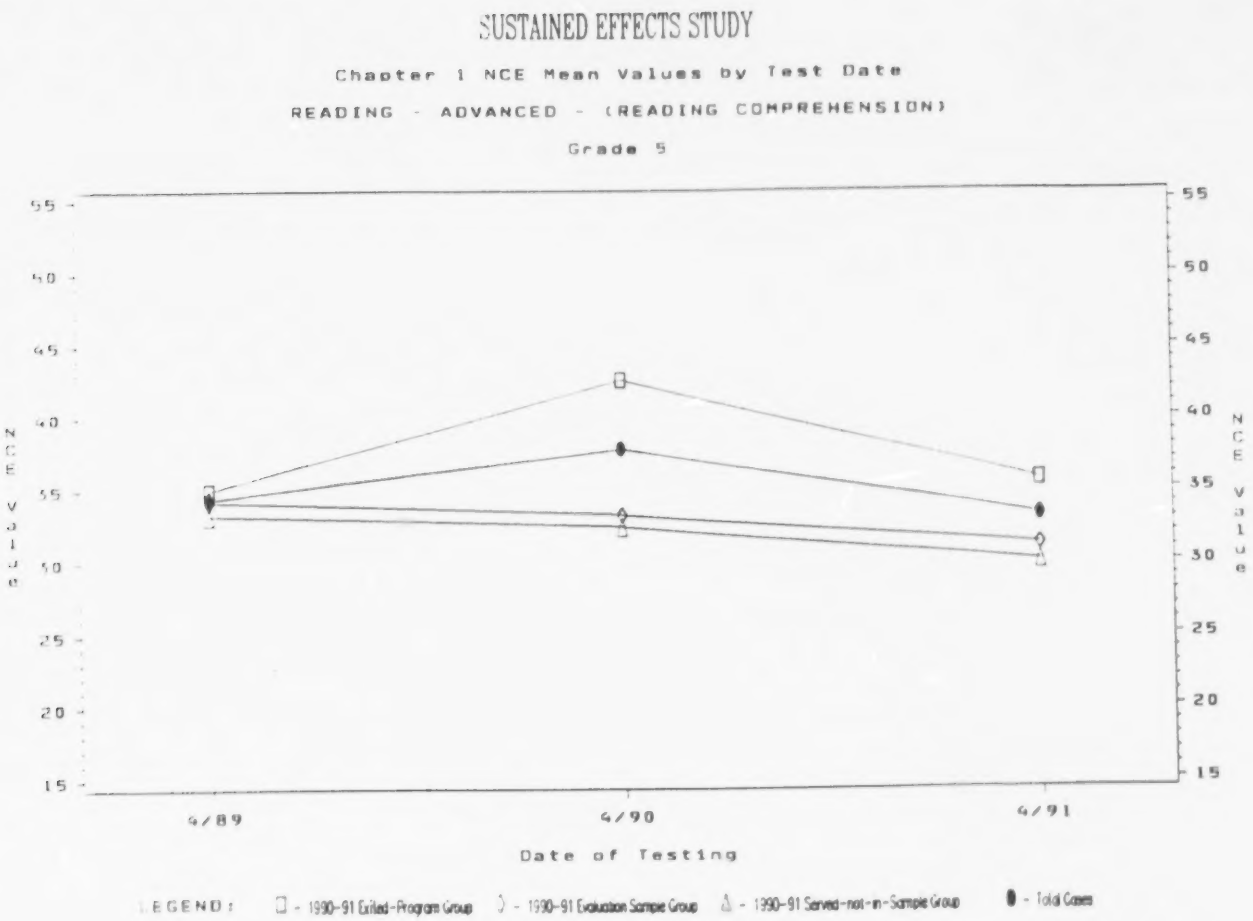


Figure 11. Average NCE for Reading Comprehension pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for fifth-graders in the 1989-90 Chapter 1 Evaluation Sample.

The average pretest-posttest change in Reading Comprehension for the four groups of pupils was: exited 7.6 (121), evaluation sample -0.9 (54), served -0.8 (61), and total 3.5 (236). The average posttest-sustained effects change for the four groups of pupils was: exited -6.9 (121), evaluation sample -2.0 (54), served -2.4 (61), and total -4.6 (236). The number of pupils appears in parentheses.

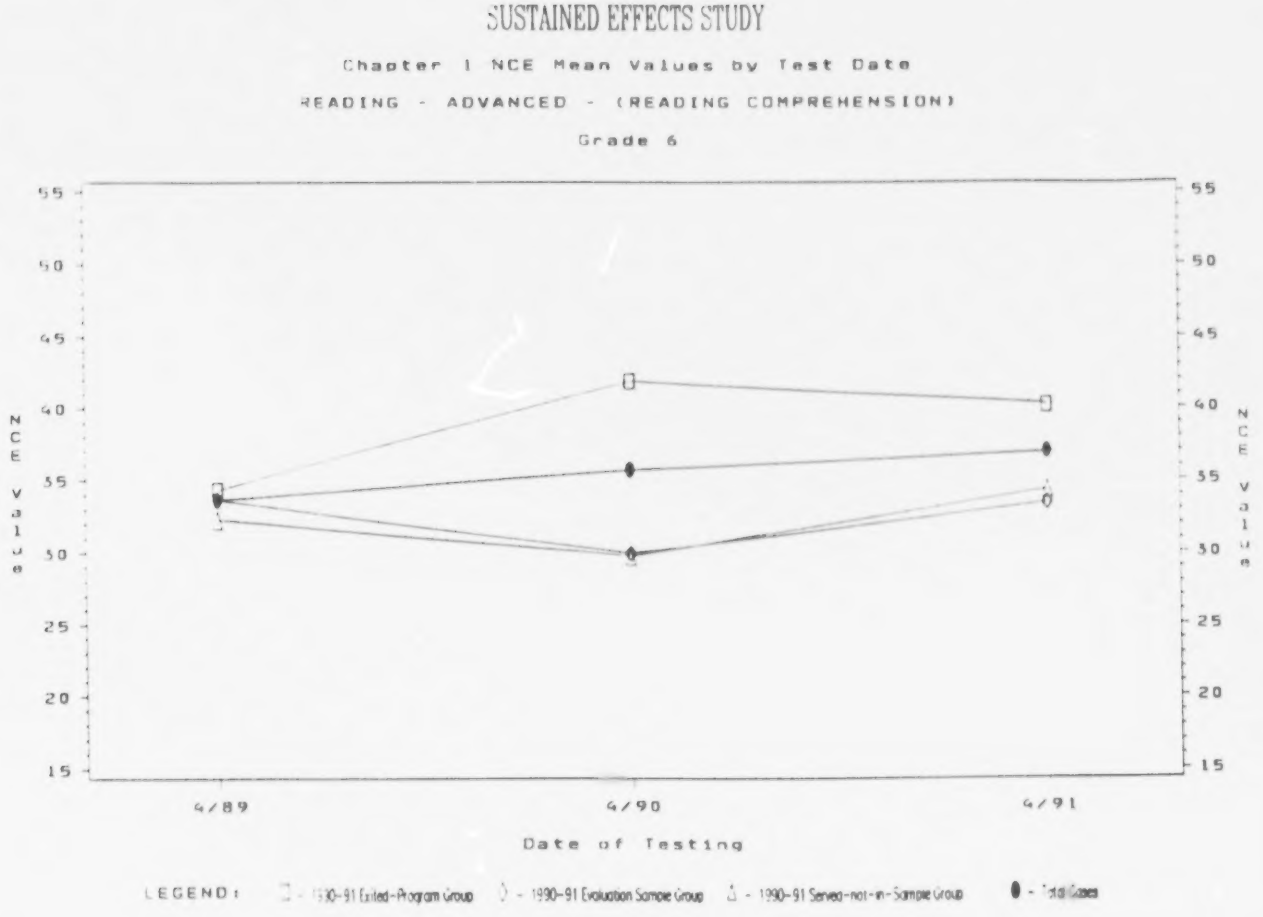


Figure 12. Average NCE for Reading Comprehension pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for sixth-graders in the 1989-90 Chapter 1 Evaluation Sample.

The average pretest-posttest change in Reading Comprehension for the four groups of pupils was: exited 7.6 (261), evaluation sample -3.7 (135), served -2.5 (144), and total 2.1 (540). The average posttest-sustained effects change for the four groups of pupils was: exited -1.7 (261), evaluation sample 3.5 (135), served 4.5 (144), and total 1.3 (540). The number of pupils appears in parentheses.

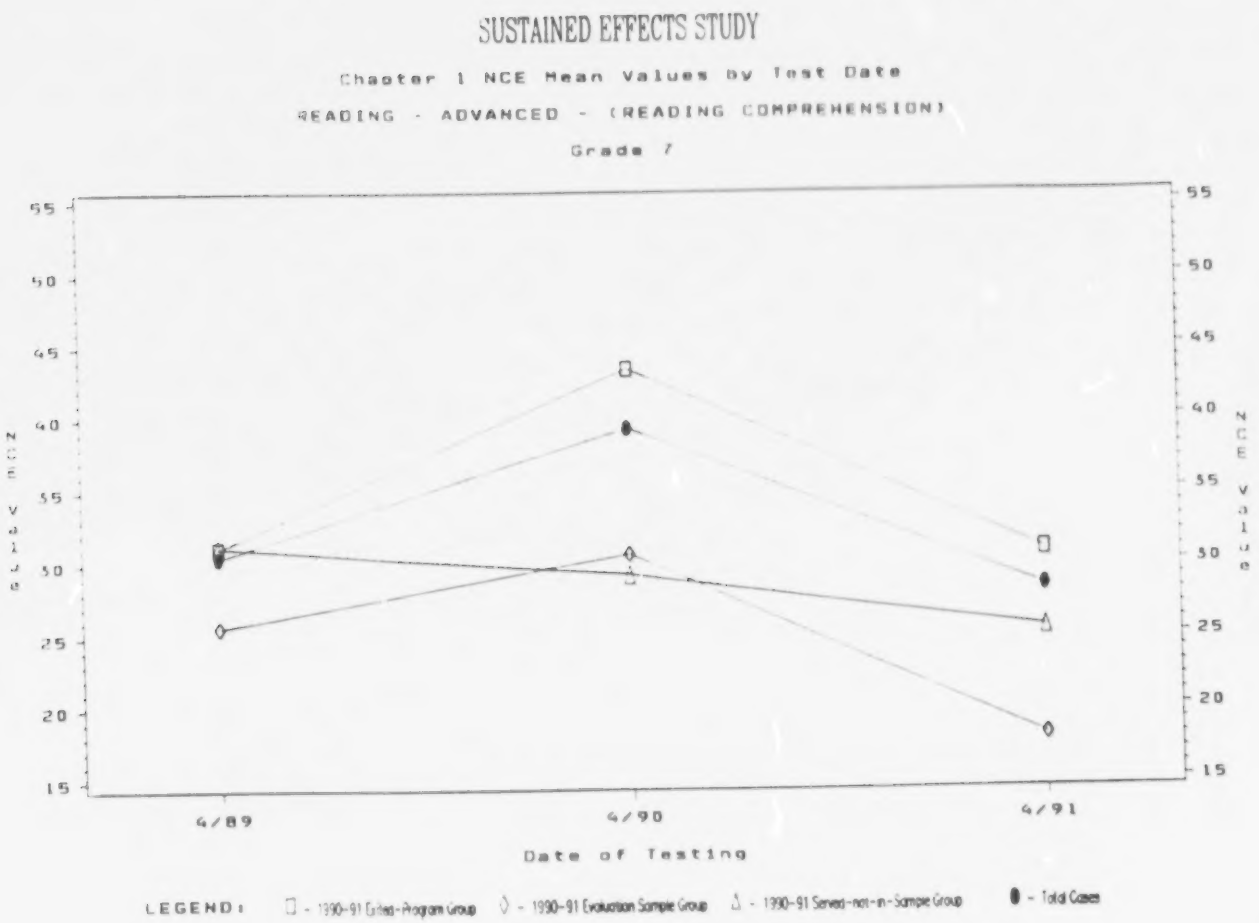


Figure 13. Average NCE for Reading Comprehension pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for seventh-graders in the 1989-90 Chapter 1 Evaluation Sample.

The average pretest-posttest change in Reading Comprehension for the four groups of pupils was: exited 12.3 (46), evaluation sample 5.0 (8), served -1.9 (12), and total 8.9 (66). The average posttest-sustained effects change for the four groups of pupils was: exited -12.5 (46), evaluation sample -12.6 (8), served -3.8 (12), and total -11.0 (66). The number of pupils appears in parentheses.

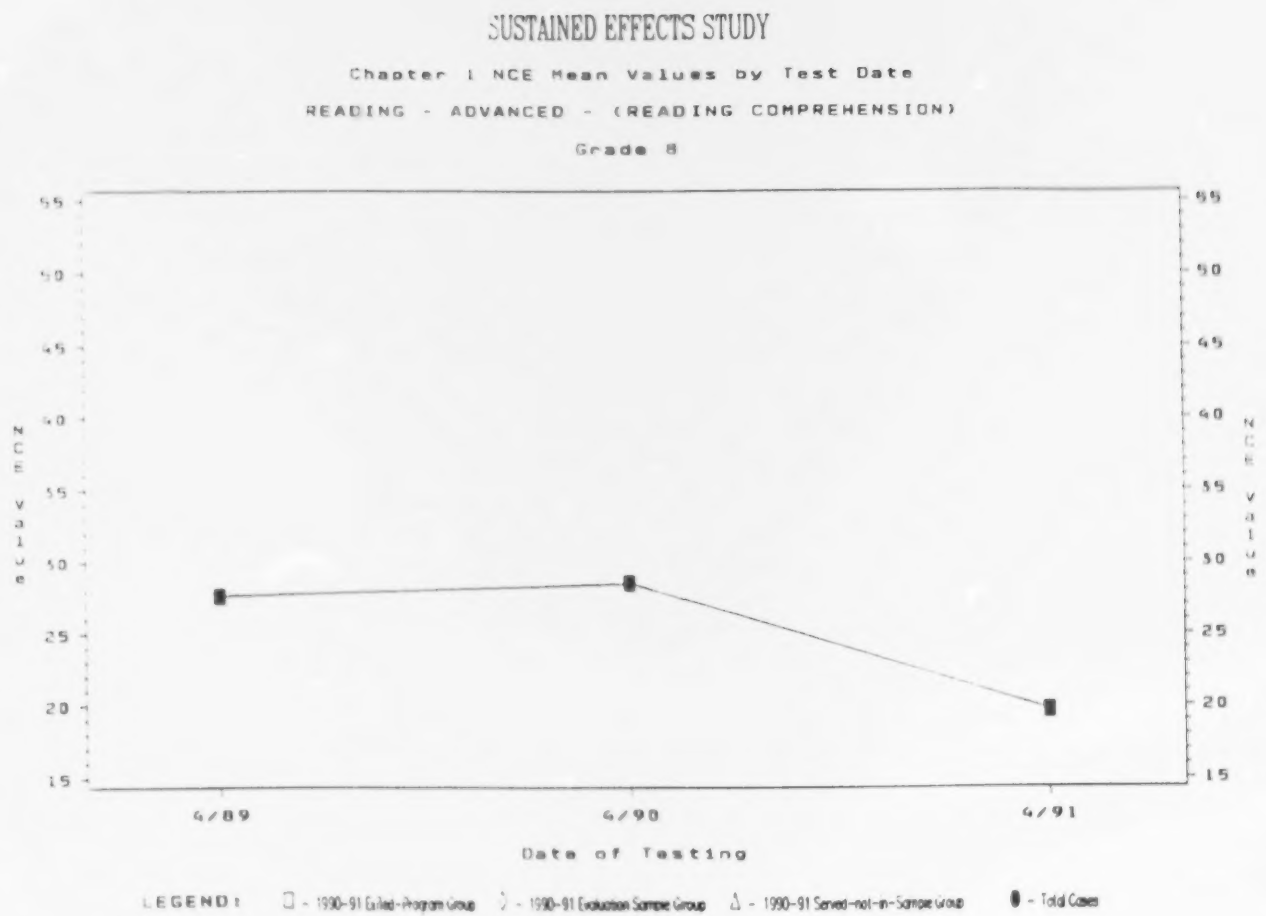


Figure 14. Average NCE for Reading Comprehension pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for eighth-graders in the 1989-90 Chapter 1 Evaluation Sample.

Eighth-grade pupils in the 1989-90 Chapter 1 evaluation sample did not have a program available to them as ninth-graders; therefore, the two groups that appear in the graph, exited and total, are the same pupils.

The average pretest-posttest change in Reading Comprehension for the pupils was: 0.9 (9). The average posttest-sustained effects change for the pupils was: -8.9 (9). The number of pupils appears in parentheses.

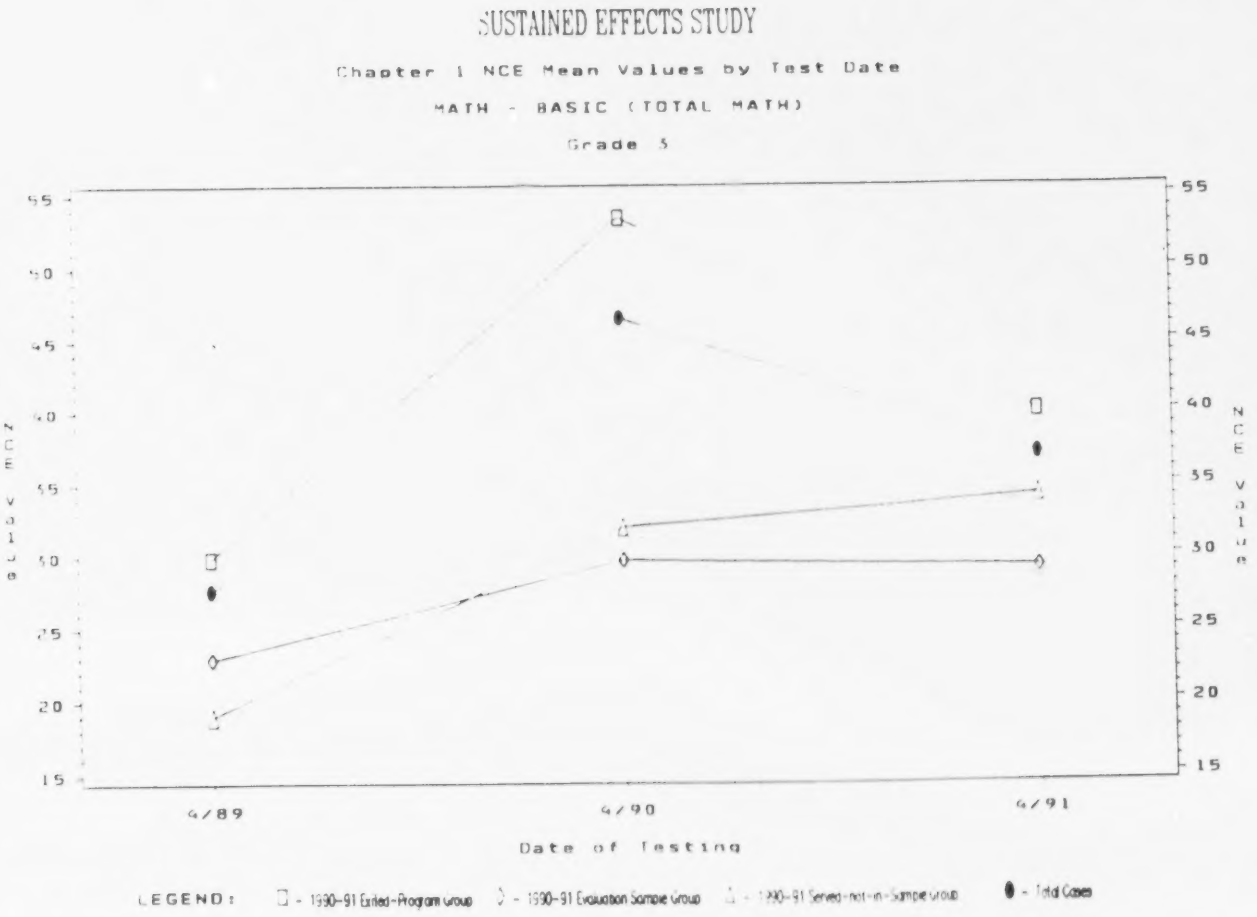


Figure 15. Average NCE for Total Math pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for third-graders in the 1989-90 Chapter 1 Evaluation Sample.

The average pretest-posttest change in Total Math for the four groups of pupils was: exited 23.6 (137), evaluation sample 6.8 (49), served 13.0 (8), and total 18.9 (194). The average posttest-sustained effects change for the four groups of pupils was: exited -13.4 (137), evaluation sample -0.5 (49), served 2.3 (8), and total -9.5 (194). The number of pupils appears in parentheses.

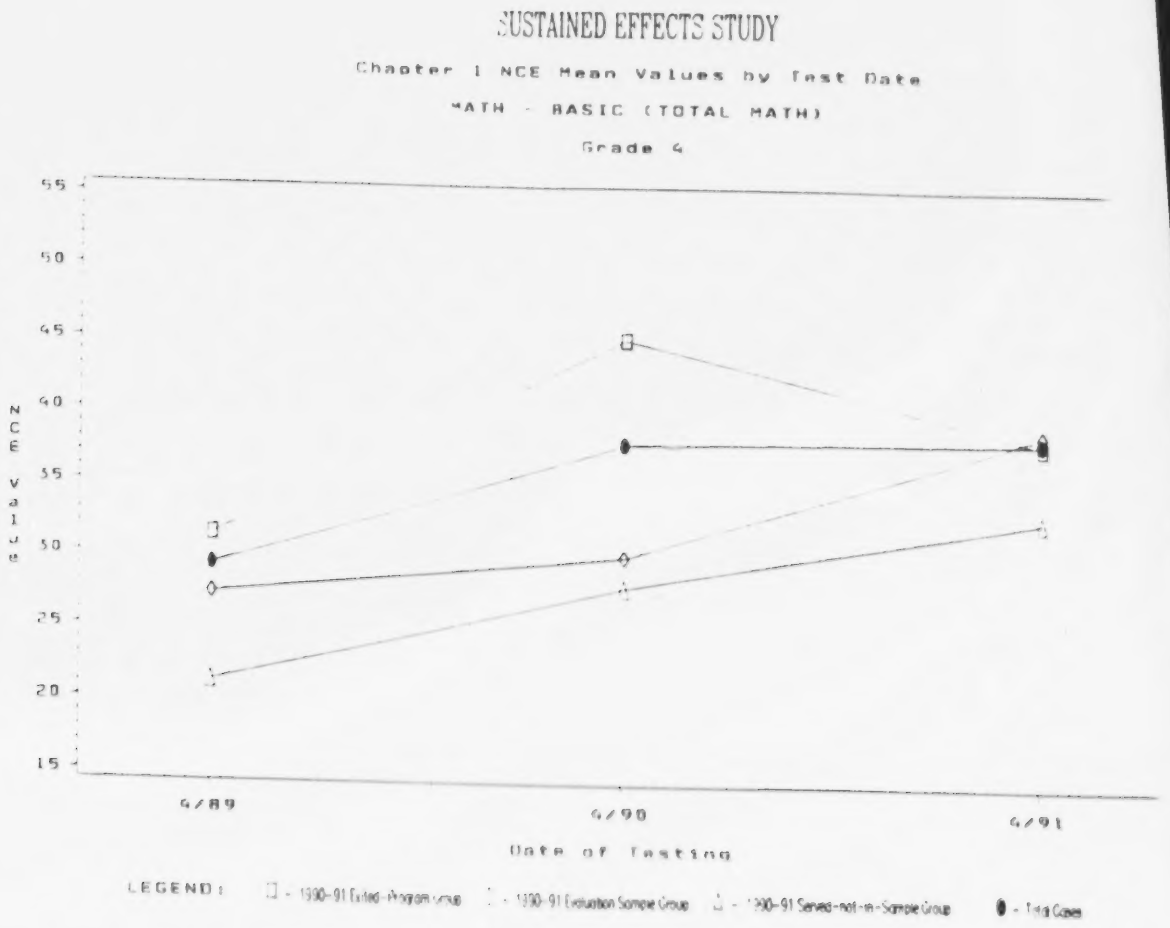


Figure 16. Average NCE for Total Math pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for fourth-graders in the 1989-90 Chapter 1 Evaluation Sample.

The average pretest-posttest change in Total Math for the four groups of pupils was: exited 13.7 (145), evaluation sample 2.7 (124), served 6.6 (8), and total 8.6 (277). The average posttest-sustained effects change for the four groups of pupils was: exited -7.1 (145), evaluation sample 8.8 (124), served 4.9 (8), and total 0.3 (277). The number of pupils appears in parentheses.

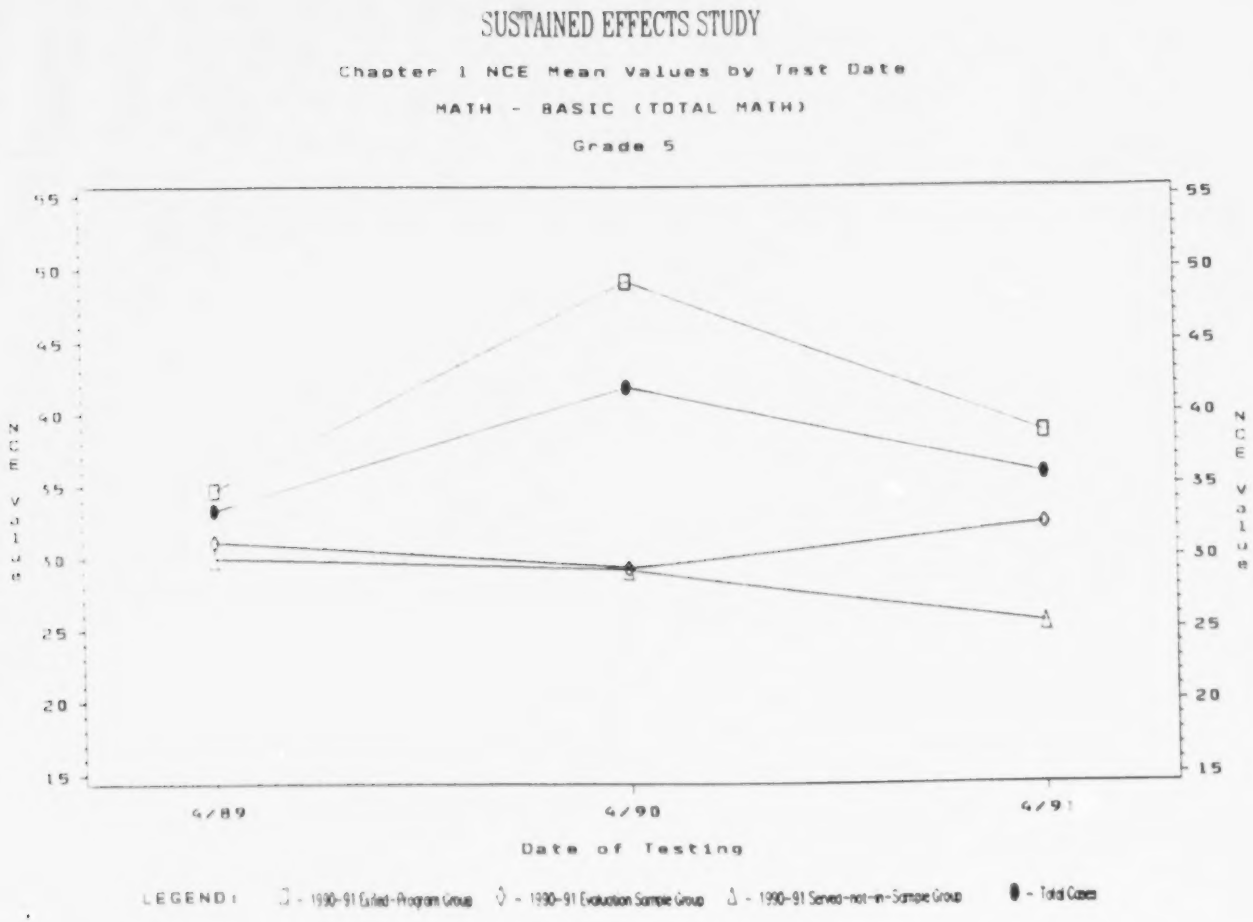


Figure 17. Average NCE for Total Math pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for fifth-graders in the 1989-90 Chapter 1 Evaluation Sample.

The average pretest-posttest change in Total Math for the four groups of pupils was: exited 14.4 (140), evaluation sample -1.8 (62), served -0.8 (19), and total 8.6 (221). The average posttest-sustained effects change for the four groups of pupils was: exited -10.4 (140), evaluation sample 3.1 (62), served -3.7 (19), and total -6.0 (221). The number of pupils appears in parentheses.

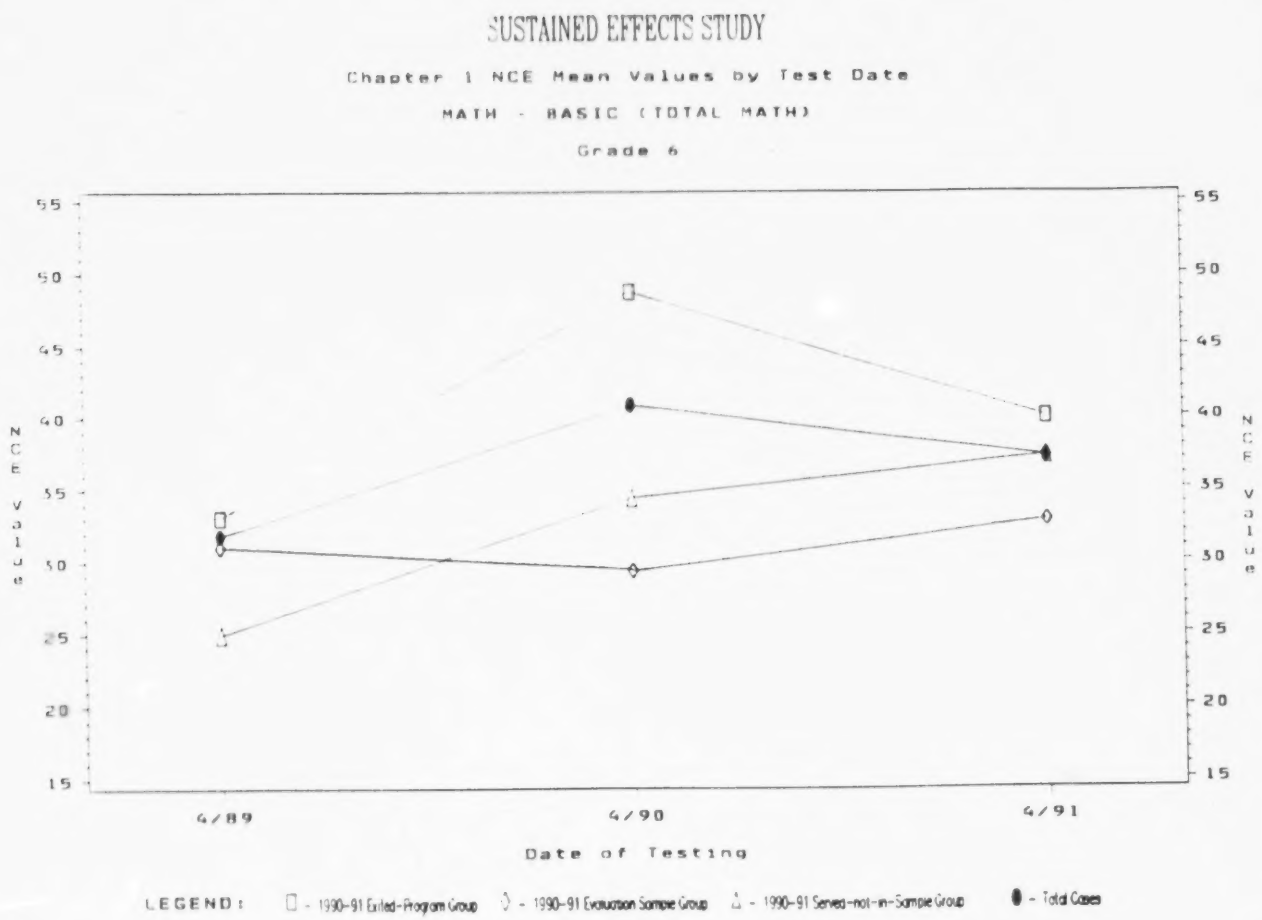


Figure 18. Average NCE for Total Math pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for sixth-graders in the 1989-90 Chapter 1 Evaluation Sample.

The average pretest-posttest change in Total Math for the four groups of pupils was: exited 15.7 (83), evaluation sample -1.7 (52), served 9.4 (9), and total 9.0 (144). The average posttest-sustained effects change for the four groups of pupils was: exited -8.7 (83), evaluation sample 3.5 (52), served 2.9 (9), and total -3.6 (144). The number of pupils appears in parentheses.

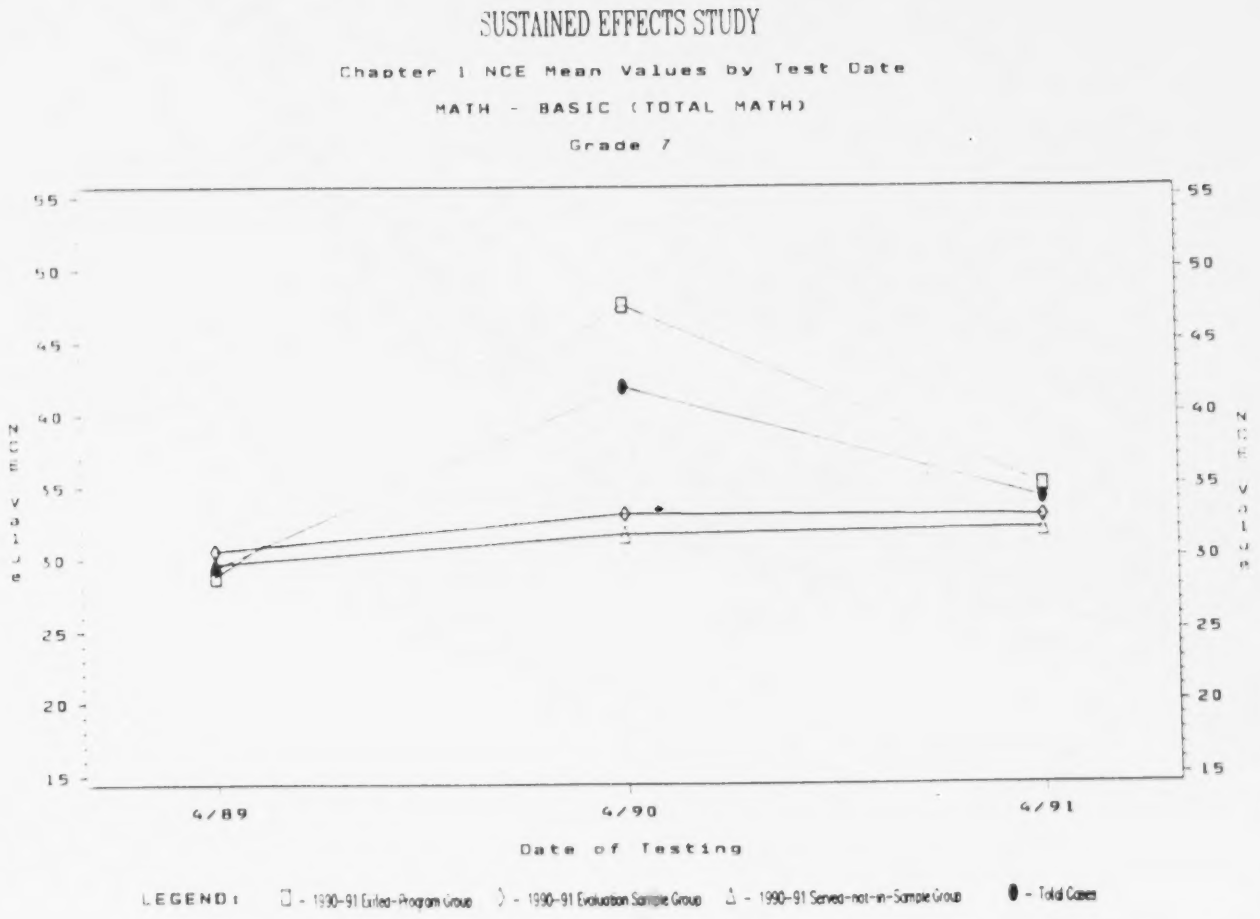


Figure 19. Average NCE for Total Math pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for seventh-graders in the 1989-90 Chapter 1 Evaluation Sample.

The average pretest-posttest change in Total Math for the four groups of pupils was: exited 18.7 (66), evaluation sample 2.5 (33), served 2.0 (8), and total 12.5 (107). The average posttest-sustained effects change for the four groups of pupils was: exited -12.5 (66), evaluation sample -0.2 (33), served 0.4 (8), and total -7.7 (107). The number of pupils appears in parentheses.

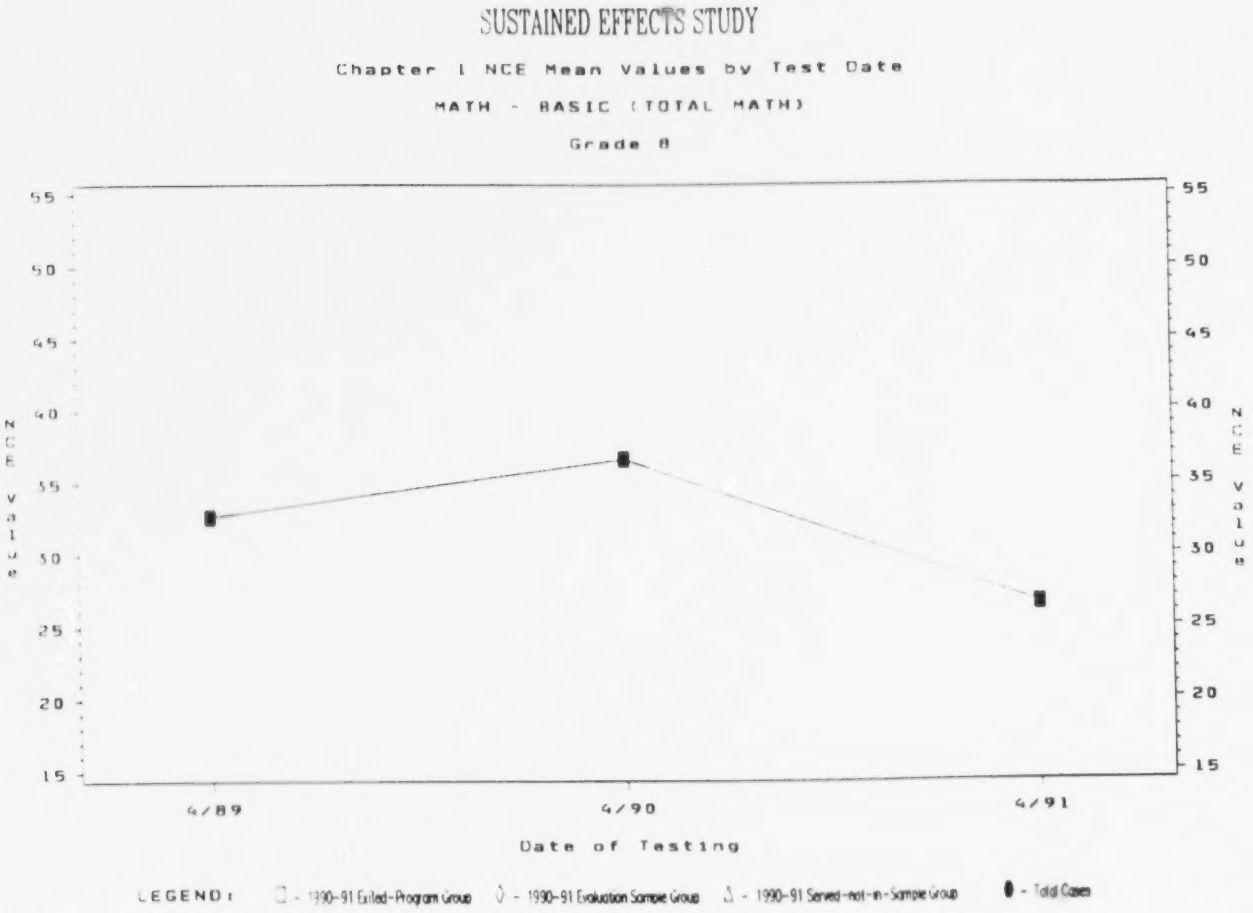


Figure 20. Average NCE for Total Math pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for eighth-graders in the 1989-90 Chapter 1 Evaluation Sample.

Eighth-grade pupils in the 1989-90 Chapter 1 evaluation sample did not have a program available to them as ninth-graders; therefore, the two groups that appear in the graph, exited and total, are the same pupils.

The average pretest-posttest change in Total Math for the pupils was: 4.0 (14). The average posttest-sustained effects change for the pupils was: -10.1 (14). The number of pupils appears in parentheses.

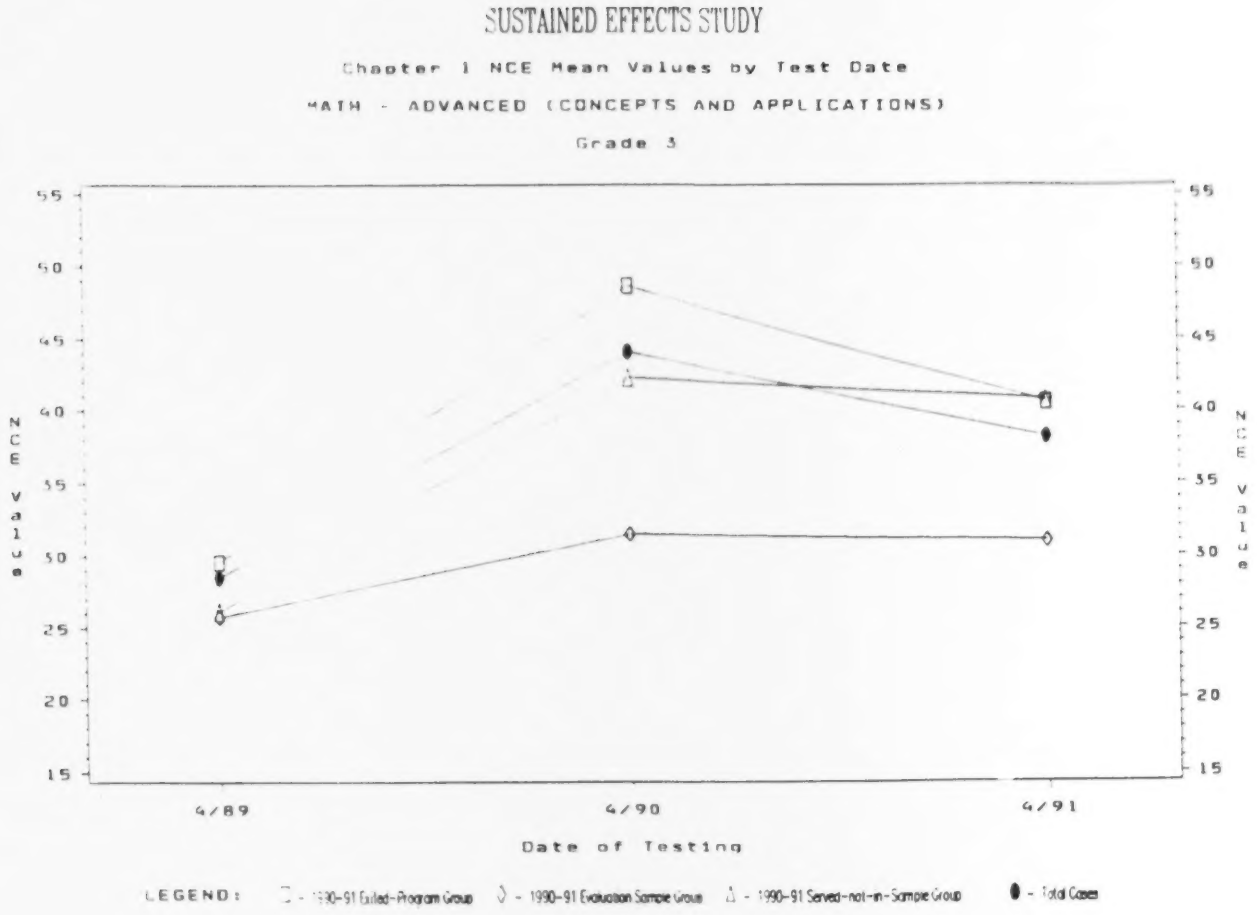


Figure 21. Average NCE for Concepts and Applications pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for third-graders in the 1989-90 Chapter 1 Evaluation Sample.

The average pretest-posttest change in Concepts and Applications for the four groups of pupils was: exited 19.1 (138), evaluation sample 5.7 (49), served 16.1 (7), and total 15.6 (194). The average posttest-sustained effects change for the four groups of pupils was: exited -8.1 (138), evaluation sample -0.4 (49), served -1.6 (7), and total -5.9 (194). The number of pupils appears in parentheses.

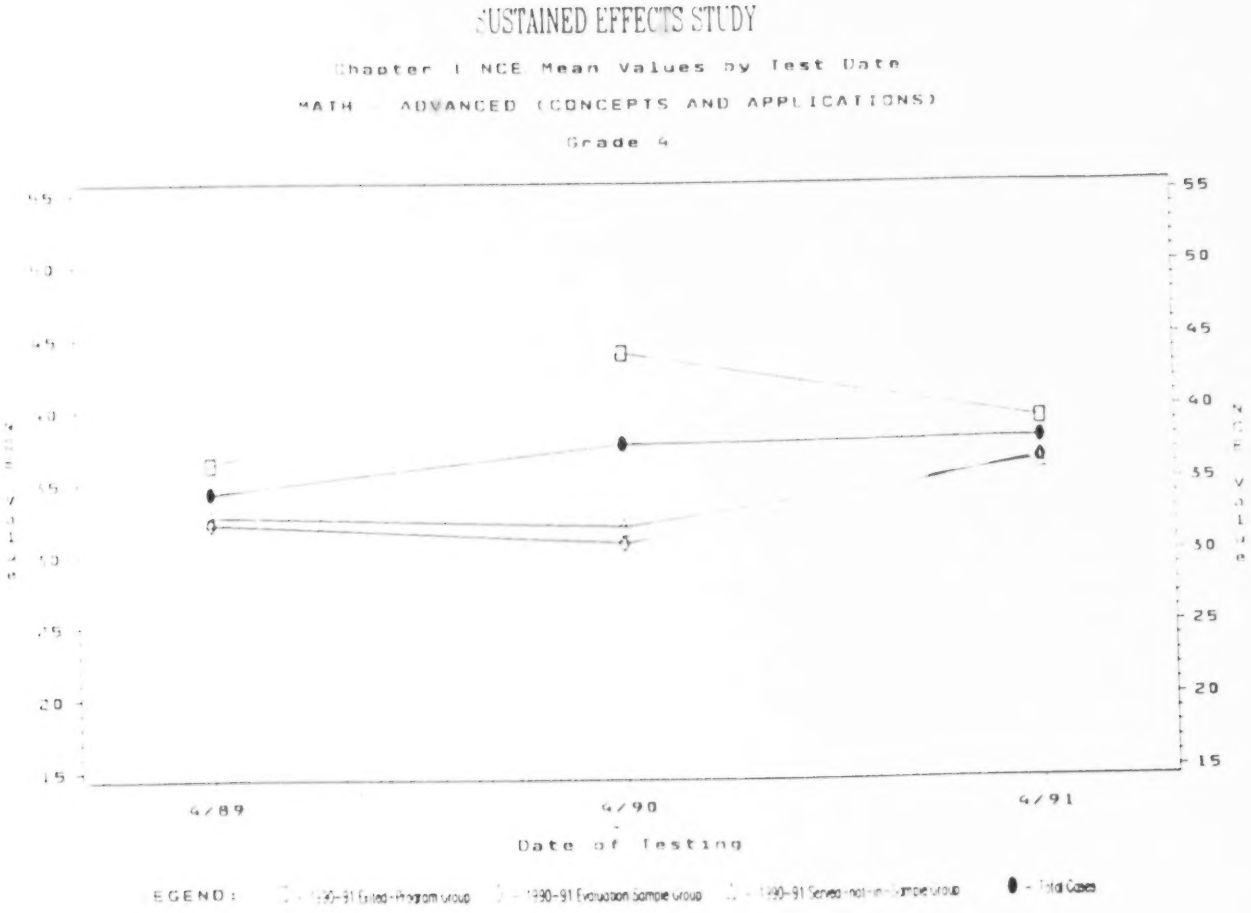


Figure 22. Average NCE for Concepts and Applications pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for fourth-graders in the 1989-90 Chapter 1 Evaluation Sample.

The average pretest-posttest change in Concepts and Applications for the four groups of pupils was: exited 7.7 (145), evaluation sample -1.4 (126), served -0.8 (8), and total 3.4 (279). The average posttest-sustained effects change for the four groups of pupils was: exited -4.6 (145), evaluation sample 5.9 (126), served 4.5 (8), and total 0.4 (279). The number of pupils appears in parentheses.

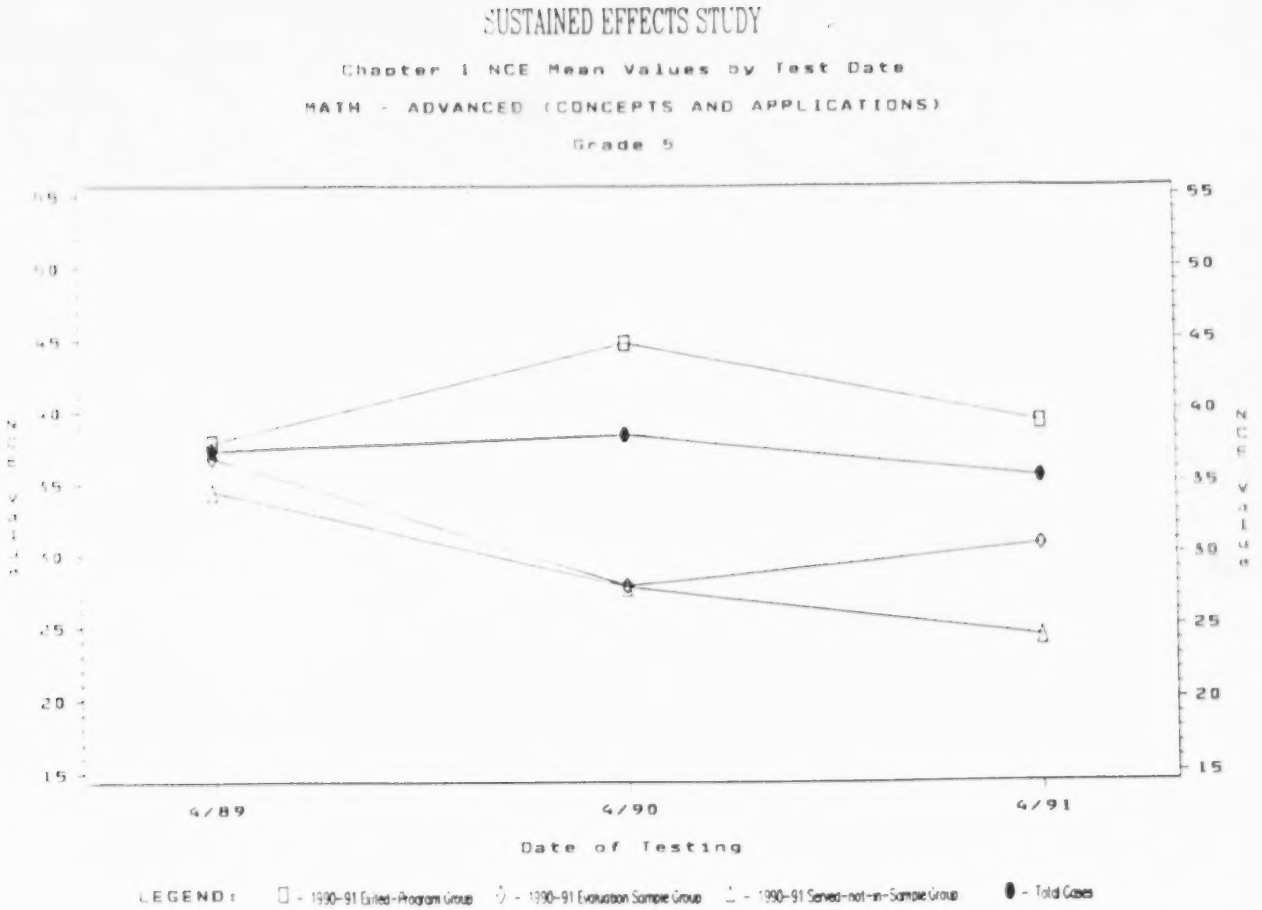


Figure 23. Average NCE for Concepts and Applications pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for fifth-graders in the 1989-90 Chapter 1 Evaluation Sample.

The average pretest-posttest change in Concepts and Applications for the four groups of pupils was: exited 6.9 (134), evaluation sample -8.9 (62), served -6.7 (19), and total 1.1 (215). The average posttest-sustained effects change for the four groups of pupils was: exited -5.5 (134), evaluation sample 2.9 (62), served -3.5 (19), and total -2.9 (215). The number of pupils appears in parentheses.

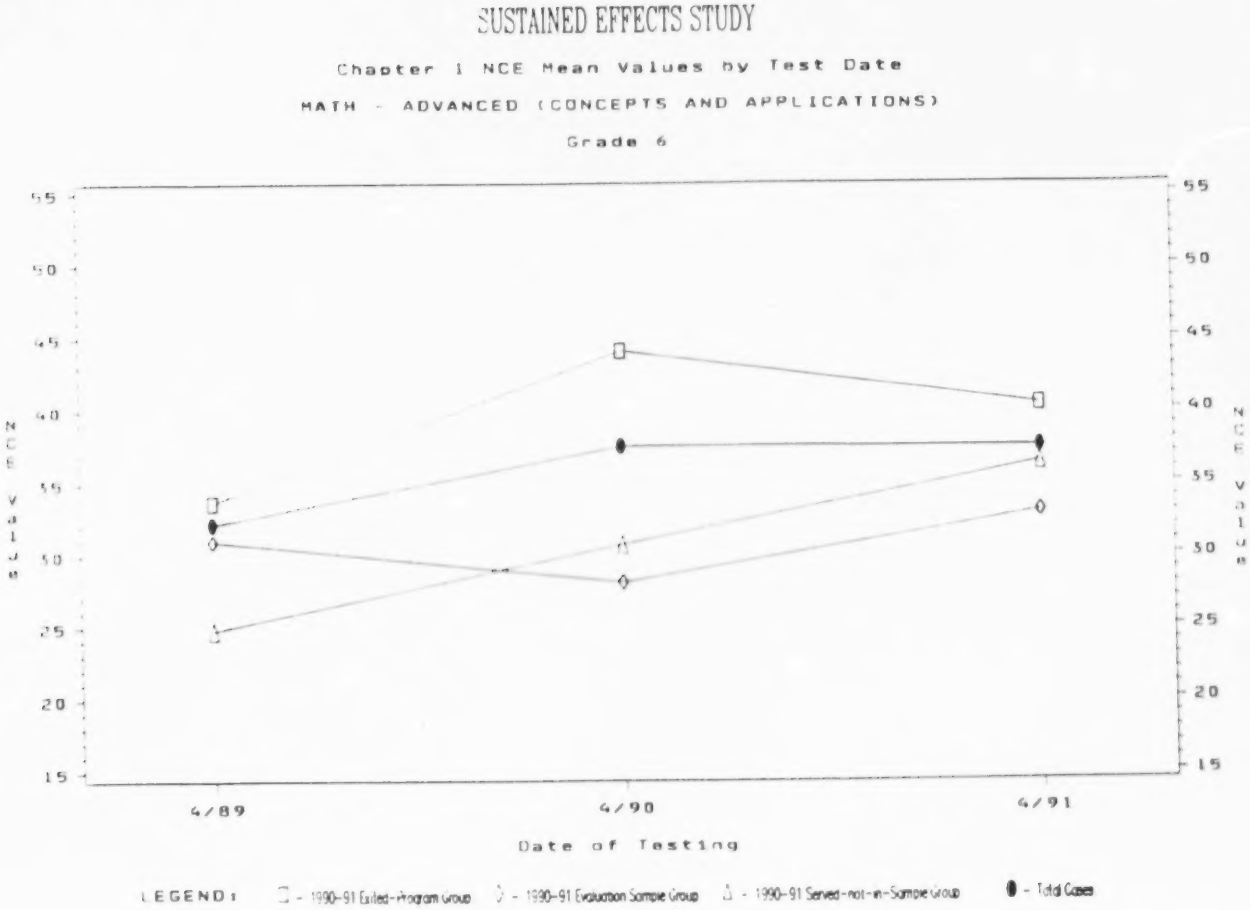


Figure 24. Average NCE for Concepts and Applications pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for sixth-graders in the 1989-90 Chapter 1 Evaluation Sample.

The average pretest-posttest change in Concepts and Applications for the four groups of pupils was: exited 10.4 (84), evaluation sample -2.9 (52), served 6.0 (9), and total 5.4 (145). The average posttest-sustained effects change for the four groups of pupils was: exited -3.7 (84), evaluation sample 4.9 (52), served 5.7 (9), and total 0.0 (145). The number of pupils appears in parentheses.

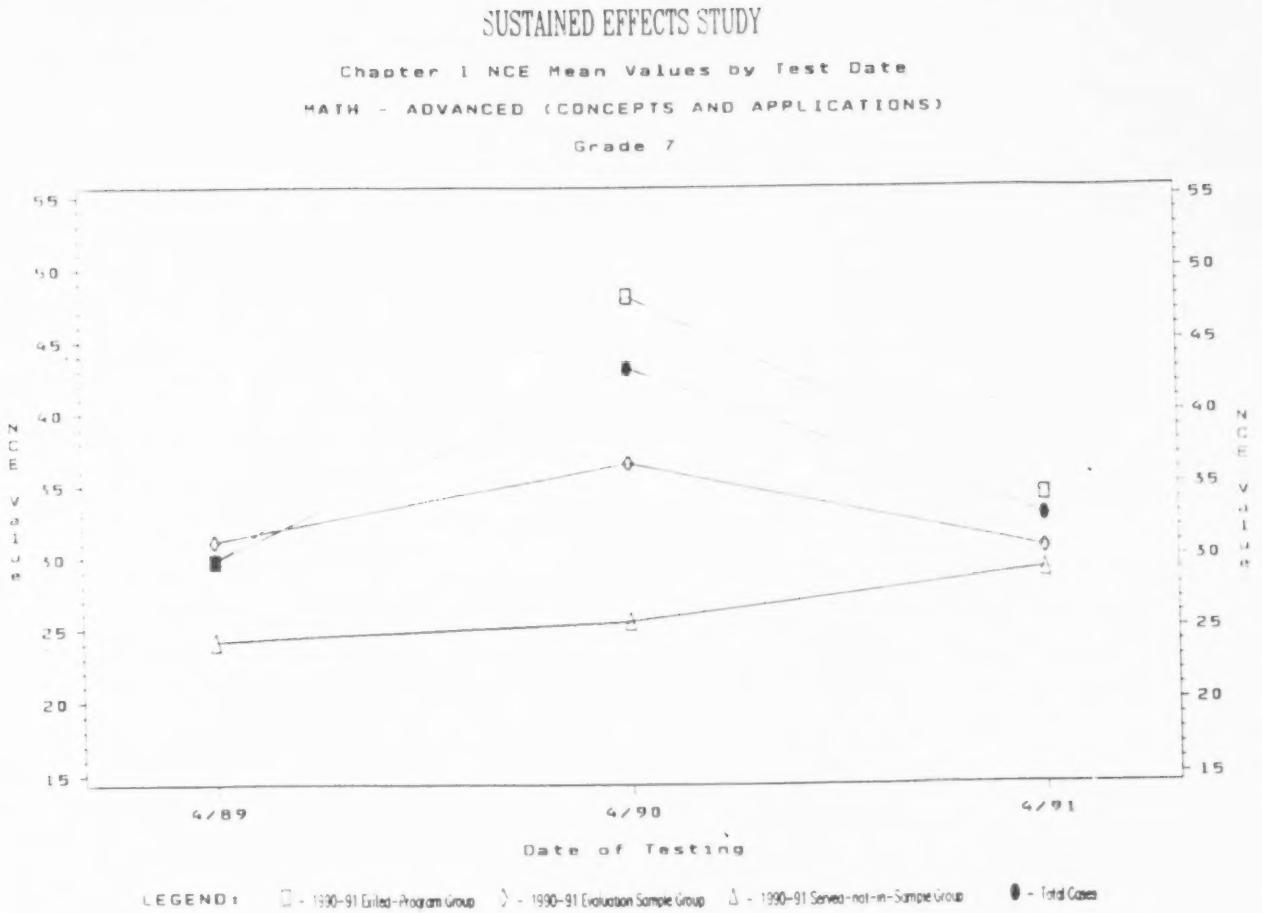


Figure 25. Average NCE for Concepts and Applications pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for seventh-graders in the 1989-90 Chapter 1 Evaluation Sample.

The average pretest-posttest change in Concepts and Applications for the four groups of pupils was: exited 18.4 (67), evaluation sample 5.4 (32), served 1.4 (7), and total 13.3 (106). The average posttest-sustained effects change for the four groups of pupils was: exited -13.8 (67), evaluation sample -5.9 (32), served 3.6 (7), and total -10.3 (106). The number of pupils appears in parentheses.

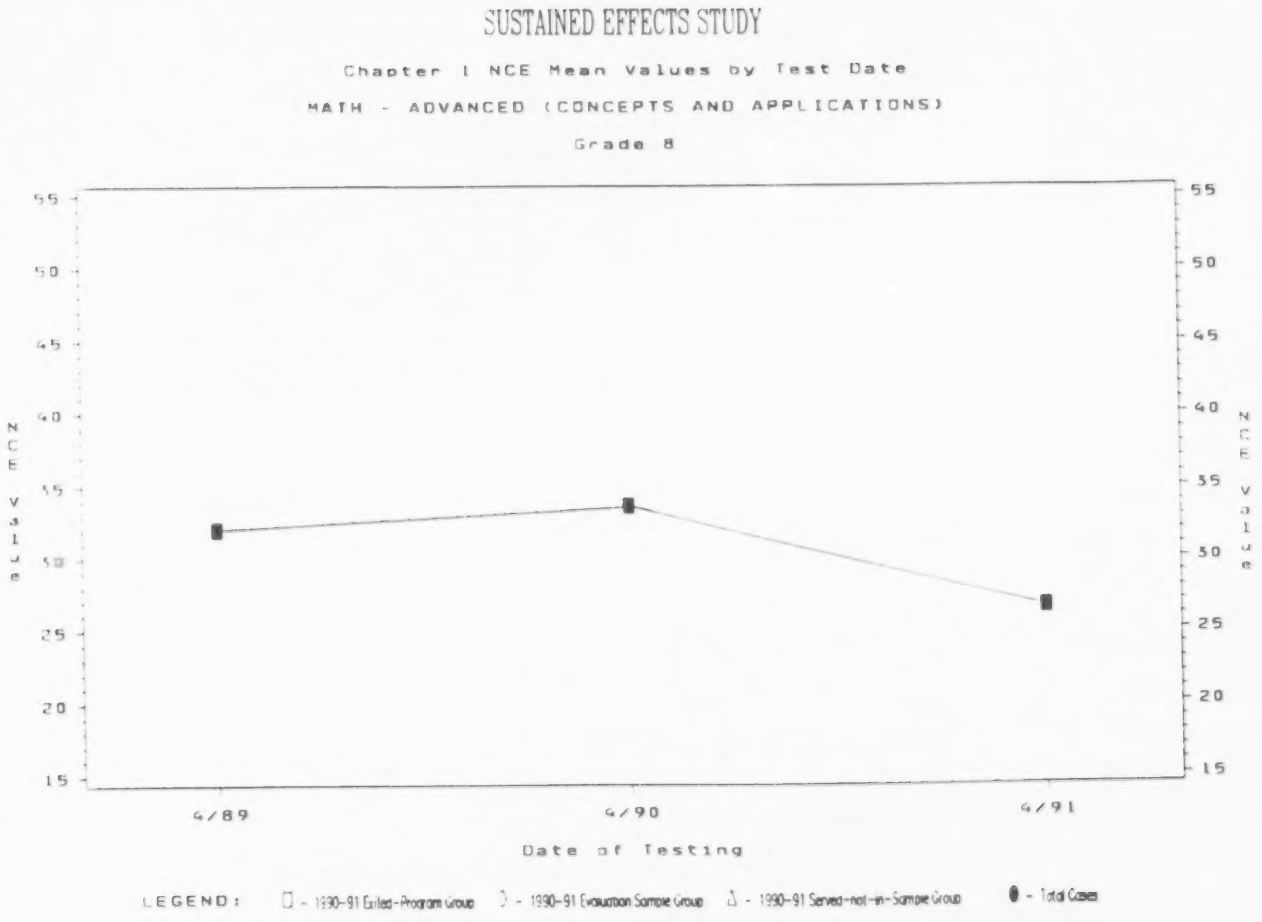


Figure 26. Average NCE for Concepts and Applications pretest (4/89), posttest (4/90), and sustained effects (4/91) scores for eighth-graders in the 1989-90 Chapter 1 Evaluation Sample.

Eighth-grade pupils in the 1989-90 Chapter 1 evaluation sample did not have a program available to them as ninth-graders; therefore, the two groups that appear in the graph, exited and total, are the same pupils.

The average pretest-posttest change in Concepts and Applications for the pupils was: 1.6 (15). The average posttest-sustained effects change for the pupils was: -7.1 (15). The number of pupils appears in parentheses.

Table 5

Sustained Effects Study
Area: Reading-Basic (Total Reading)
Group: **EXITED**
NCE Counts, Means and Standard Deviations
by Test Date and Change Values

1989-90 Grade

Testing[a] Points	2 N	2 MEAN	2 SD	3 N	3 MEAN	3 SD	4 N	4 MEAN	4 SD	5 N	5 MEAN	5 SD	6 N	6 MEAN	6 SD	7 N	7 MEAN	7 SD	8 N	8 MEAN	8 SD
4/89 PRE	248	31.1	15.1	320	28.9	12.9	166	34.1	9.5	126	36.4	9.4	260	35.2	9.6	48	31.6	7.0	9	30.9	6.7
4/90 POS	248	47.1	14.1	320	42.4	9.6	166	42.9	7.9	126	42.5	7.3	260	41.4	9.3	48	41.3	7.8	9	31.4	11.2
4/91 SE	248	45.1	10.7	320	38.5	11.2	166	39.7	10.6	126	36.2	9.6	260	39.8	10.8	48	32.3	9.5	9	29.2	4.0
POS-PRE[b]	248	16.1	16.3	320	13.5	10.7	166	8.8	7.5	126	6.1	9.2	260	6.2	8.8	48	9.6	7.0	9	0.6	10.0
SE-POS[b]	248	-2.1	13.5	320	-3.9	10.1	166	-3.2	10.1	126	-6.3	7.9	260	-1.6	9.6	48	-9.1	9.6	9	-2.2	12.6
SE-PRE[b]	248	14.0	16.2	320	9.6	12.7	166	5.6	10.5	126	-0.2	9.6	260	4.7	9.0	48	0.6	8.9	9	-1.7	6.2

Table 6

Sustained Effects Study
Area: Reading-Basic (Total Reading)
Group: **EVALUATION SAMPLE**
NCE Counts, Means and Standard Deviations
by Test Date and Change Values

1989-90 Grade

Testing[a] Points	2 N	2 MEAN	2 SD	3 N	3 MEAN	3 SD	4 N	4 MEAN	4 SD	5 N	5 MEAN	5 SD	6 N	6 MEAN	6 SD	7 N	7 MEAN	7 SD	8 N	8 MEAN	8 SD
4/89 PRE	143	25.6	15.8	78	28.9	11.8	75	32.9	9.9	59	33.9	8.9	134	32.7	8.3	8	24.0	11.5	0	0	0
4/90 POS	143	28.1	11.2	78	29.2	9.1	75	30.5	8.6	59	31.5	6.6	134	30.2	8.0	8	29.3	7.9	0	0	0
4/91 SE	143	33.4	11.5	78	32.0	14.0	75	32.7	11.9	59	30.6	8.2	134	33.6	10.7	8	19.5	14.0	0	0	0
POS-PRE[b]	143	2.5	14.2	78	0.2	11.3	75	-2.5	9.9	59	-2.4	7.3	134	-2.5	8.5	8	5.3	8.5	0	0	0
SE-POS[b]	143	5.3	12.0	78	2.8	13.2	75	2.2	12.6	59	-0.9	8.4	134	3.3	10.5	8	-9.8	15.2	0	0	0
SE-PRE[b]	143	7.8	16.0	78	3.0	14.8	75	-0.3	10.4	59	-3.3	9.7	134	0.9	10.2	8	-4.5	15.5	0	0	0

[a] PRE=Pretest, POS=Posttest, SE=Sustained Effect, POS-PRE=Posttest minus Pretest, SE-POS=Sustained Effect minus Posttest, SE-PRE=Sustained Effect minus Pretest

[b] Rounding caused some change values to differ from expected values.

Table 7

Sustained Effects Study
Area: Reading-Basic (Total Reading)
Group: **SERVED**
NCE Counts, Means and Standard Deviations
by Test Date and Change Values

1989-90 Grade

Testing[a] Points	2 N	2 MEAN	2 SD	3 N	3 MEAN	3 SD	4 N	4 MEAN	4 SD	5 N	5 MEAN	5 SD	6 N	6 MEAN	6 SD	7 N	7 MEAN	7 SD	8 N	8 MEAN	8 SD
4/89 PRE	86	22.7	13.7	90	26.8	11.1	90	30.4	8.3	61	33.8	8.1	142	31.6	9.3	13	31.3	7.7	0	0	0
4/90 POS	86	27.0	14.1	90	28.6	9.1	90	29.3	9.1	61	30.8	8.6	142	29.4	8.5	13	29.5	9.6	0	0	0
4/91 SE	86	32.3	11.7	90	31.9	10.2	90	32.4	10.9	61	29.5	9.6	142	34.0	9.2	13	28.2	12.8	0	0	0
POS-PRE[b]	86	4.3	15.0	90	1.8	11.1	90	-1.1	10.0	61	-2.9	10.0	142	-2.2	8.7	13	-1.8	8.8	0	0	0
SE-POS[b]	86	5.3	12.1	90	3.3	11.2	90	3.1	10.5	61	-1.3	11.0	142	4.6	8.4	13	-1.2	14.1	0	0	0
SE-PRE[b]	86	9.6	16.9	90	5.1	14.3	90	1.9	10.9	61	-4.2	10.0	142	2.4	9.3	13	-3.1	10.3	0	0	0

Table 8

Sustained Effects Study
Area: Reading-Basic (Total Reading)
Group: **TOTAL**
NCE Counts, Means and Standard Deviations
by Test Date and Change Values

1989-90 Grade

Testing[a] Points	2 N	2 MEAN	2 SD	3 N	3 MEAN	3 SD	4 N	4 MEAN	4 SD	5 N	5 MEAN	5 SD	6 N	6 MEAN	6 SD	7 N	7 MEAN	7 SD	8 N	8 MEAN	8 SD
4/89 PRE	477	27.9	15.4	488	28.5	12.4	331	32.8	9.4	246	35.1	9.0	536	33.6	9.3	69	30.7	8.0	9	30.9	6.7
4/90 POS	477	37.8	16.4	488	37.7	11.4	331	36.4	10.6	246	37.0	9.4	536	35.4	10.5	69	37.6	9.7	9	31.4	11.2
4/91 SE	477	39.3	12.6	488	36.2	11.9	331	36.1	11.5	246	33.2	9.7	536	36.7	10.8	69	30.0	11.4	9	29.2	4.6
POS-PRE[b]	477	9.9	16.7	488	9.2	12.4	331	3.6	10.2	246	1.8	10.0	536	1.8	9.7	69	7.0	8.7	9	0.6	10.0
SE-POS[b]	477	1.5	13.3	488	-1.5	11.3	331	-0.3	11.2	246	-3.8	9.2	536	1.3	9.9	69	-7.7	11.5	9	-2.2	12.6
SE-PRE[b]	477	11.4	16.5	488	7.8	13.6	331	3.3	10.8	246	-1.9	9.9	536	3.1	9.5	69	-0.7	10.1	9	-1.7	6.2

[a] PRE=Pretest, POS=Posttest, SE=Sustained Effect, POS-PRE=Posttest minus Pretest, SE-POS=Sustained Effect minus Posttest, SE-PRE=Sustained Effect minus Pretest

[b] Rounding caused some change values to differ from expected values.

Table 9

Sustained Effects Study
Area: Reading-Advanced (Reading Comprehension)
Group: **EXITED**
NCE Counts, Means and Standard Deviations
by Test Date and Change Values

1989-90 Grade

Testing[a] Points	2 N	2 MEAN	2 SD	3 N	3 MEAN	3 SD	4 N	4 MEAN	4 SD	5 N	5 MEAN	5 SD	6 N	6 MEAN	6 SD	7 N	7 MEAN	7 SD	8 N	8 MEAN	8 SD
4/89 PRE	255	28.4	14.2	243	27.6	13.5	168	36.4	9.2	121	34.9	11.1	261	34.3	8.3	46	31.1	5.3	9	27.7	8.8
4/90 POS	255	48.5	15.3	243	45.8	9.9	168	44.0	7.8	121	42.6	6.8	261	41.9	10.1	46	43.4	8.4	9	28.6	16.7
4/91 SE	255	46.8	10.7	243	39.4	12.0	168	40.6	10.5	121	35.7	10.5	261	40.2	11.7	46	30.9	10.5	9	19.7	10.3
POS-PRE[b]	255	20.0	18.6	243	18.2	12.8	168	7.5	9.1	121	7.6	10.4	261	7.6	9.7	46	12.3	9.1	9	0.9	15.4
SE-POS[b]	255	-1.7	15.2	243	-6.4	11.7	168	-3.4	10.7	121	-6.9	9.9	261	-1.7	11.9	46	-12.5	10.6	9	-8.9	18.3
SE-PRE[b]	255	18.4	15.8	243	11.7	14.8	168	4.2	11.3	121	0.7	11.4	261	5.9	11.2	46	-0.2	10.3	9	-8.0	8.2

Table 10

Sustained Effects Study
Area: Reading-Advanced (Reading Comprehension)
Group: **EVALUATION SAMPLE**
NCE Counts, Means and Standard Deviations
by Test Date and Change Values

1989-90 Grade

Testing[a] Points	2 N	2 MEAN	2 SD	3 N	3 MEAN	3 SD	4 N	4 MEAN	4 SD	5 N	5 MEAN	5 SD	6 N	6 MEAN	6 SD	7 N	7 MEAN	7 SD	8 N	8 MEAN	8 SD
4/89 PRE	115	23.9	13.3	69	29.9	12.3	75	36.4	8.9	54	34.2	11.2	135	33.7	5.6	8	25.6	10.0	0	0	0
4/90 POS	115	31.3	11.4	69	33.7	8.0	75	31.6	11.6	54	33.2	5.8	135	30.0	7.9	8	30.6	9.3	0	0	0
4/91 SE	115	37.7	11.0	69	31.6	16.3	75	35.5	10.1	54	31.2	9.5	135	33.5	11.5	8	18.0	14.9	0	0	0
POS-PRE[b]	115	7.4	14.0	69	3.8	12.0	75	-4.8	12.9	54	-0.9	10.7	135	-3.7	8.3	8	5.0	7.4	0	0	0
SE-POS[b]	115	6.4	13.8	69	-2.1	15.8	75	3.9	14.7	54	-2.0	9.2	135	3.5	12.0	8	-12.6	14.6	0	0	0
SE-PRE[b]	115	13.8	16.1	69	1.7	17.2	75	-0.9	9.5	54	-3.0	12.6	135	-0.2	11.4	8	-7.6	18.4	0	0	0

[a] PRE=Pretest, POS=Posttest, SE=Sustained Effect, POS-PRE=Posttest minus Pretest, SE-POS=Sustained Effect minus Posttest, SE-PRE=Sustained Effect minus Pretest

[b] Rounding caused some change values to differ from expected values.

Table 11

Sustained Effects Study
Area: Reading-Advanced (Reading Comprehension)
Group: **SERVED**
NCE Counts, Means and Standard Deviations
by Test Date and Change Values

1989-90 Grade

Testing[a] Points	2 N	2 MEAN	2 SD	3 N	3 MEAN	3 SD	4 N	4 MEAN	4 SD	5 N	5 MEAN	5 SD	6 N	6 MEAN	6 SD	7 N	7 MEAN	7 SD	8 N	8 MEAN	8 SD
4/89 PRE	117	24.1	16.4	77	28.0	12.5	90	34.6	8.2	61	33.2	10.4	144	32.3	8.3	12	31.2	5.0	0	0	0
4/90 POS	117	30.7	13.5	77	34.1	10.5	90	31.1	11.5	61	32.4	7.8	144	29.8	8.6	12	29.3	11.9	0	0	0
4/91 SE	117	36.6	11.2	77	34.5	12.3	90	35.1	9.3	61	30.0	10.3	144	34.4	9.0	12	25.5	15.6	0	0	0
POS-PRE[b]	117	6.7	17.4	77	6.1	14.8	90	-3.4	12.8	61	-0.8	12.3	144	-2.5	9.0	12	-1.9	12.0	0	0	0
SE-POS[b]	117	5.8	13.2	77	0.4	14.5	90	3.9	11.7	61	-2.4	11.3	144	4.5	10.0	12	-3.8	17.4	0	0	0
SE-PRE[b]	117	12.5	17.3	77	6.5	17.1	90	0.5	10.4	61	-3.2	13.6	144	2.0	10.0	12	-5.7	12.8	0	0	0

Table 12

Sustained Effects Study
Area: Reading-Advanced (Reading Comprehension)
Group: **TOTAL**
NCE Counts, Means and Standard Deviations
by Test Date and Change Values

1989-90 Grade

Testing[a] Points	2 N	2 MEAN	2 SD	3 N	3 MEAN	3 SD	4 N	4 MEAN	4 SD	5 N	5 MEAN	5 SD	6 N	6 MEAN	6 SD	7 N	7 MEAN	7 SD	8 N	8 MEAN	8 SD
4/89 PRE	487	26.3	14.7	389	28.1	13.1	333	35.9	8.9	236	34.3	10.9	540	33.6	7.7	66	30.4	6.1	9	27.7	8.8
4/90 POS	487	40.1	16.5	389	41.3	11.3	333	37.7	11.7	236	37.8	8.4	540	35.7	11.0	66	39.3	11.1	9	28.6	16.7
4/91 SE	487	42.2	11.9	389	37.0	13.3	333	38.0	10.4	236	33.2	10.5	540	37.0	11.4	66	28.3	12.7	9	19.7	10.3
POS-PRE[b]	487	13.8	18.5	389	13.2	14.5	333	1.8	12.5	236	3.5	11.7	540	2.1	10.6	66	8.9	10.9	9	0.9	15.4
SE-POS[b]	487	2.0	14.9	389	-4.3	13.4	333	0.2	12.5	236	-4.6	10.3	540	1.3	11.8	66	-11.0	12.8	9	-8.9	18.3
SE-PRE[b]	487	15.9	16.4	389	8.9	16.1	333	2.0	10.9	236	-1.1	12.4	540	3.4	11.2	66	-2.1	12.1	9	-8.0	8.2

[a] PRE=Pretest, POS=Posttest, SE=Sustained Effect, POS-PRE=Posttest minus Pretest, SE-POS=Sustained Effect minus Posttest, SE-PRE=Sustained Effect minus Pretest

[b] Rounding caused some change values to differ from expected values.

Table 13

Sustained Effects Study
Area: Math-Basic (Total Math)
Group: **EXITED**
NCE Counts, Means and Standard Deviations
by Test Date and Change Values

1989-90 Grade

Testing[a] Points	2 N	2 MEAN	2 SD	3 N	3 MEAN	3 SD	4 N	4 MEAN	4 SD	5 N	5 MEAN	5 SD	6 N	6 MEAN	6 SD	7 N	7 MEAN	7 SD	8 N	8 MEAN	8 SD
4/89 PRE	0	0	0	137	29.8	14.2	145	31.4	10.4	140	34.7	9.9	83	33.1	10.1	66	28.8	8.9	14	32.6	4.3
4/90 POS	0	0	0	137	53.4	12.7	145	45.1	10.5	140	49.1	11.8	83	48.7	12.1	66	47.5	11.3	14	36.6	4.4
4/91 SE	0	0	0	137	40.0	11.7	145	38.0	12.7	140	38.8	11.8	83	40.0	13.0	66	35.0	13.2	14	26.6	11.7
POS-PRE[b]	0	0	0	137	23.6	14.5	145	13.7	10.5	140	14.4	12.0	83	15.7	13.2	66	18.7	13.1	14	4.0	5.7
SE-POS[b]	0	0	0	137	-13.4	13.7	145	-7.1	12.3	140	-10.4	12.3	83	-8.7	14.6	66	-12.5	14.4	14	-10.1	10.0
SE-PRE[b]	0	0	0	137	10.2	15.8	145	6.6	13.0	140	4.0	12.4	83	7.0	14.0	66	6.2	13.5	14	-6.1	11.7

Table 14

Sustained Effects Study
Area: Math-Basic (Total Math)
Group: **EVALUATION SAMPLE**
NCE Counts, Means and Standard Deviations
by Test Date and Change Values

1989-90 Grade

Testing[a] Points	2 N	2 MEAN	2 SD	3 N	3 MEAN	3 SD	4 N	4 MEAN	4 SD	5 N	5 MEAN	5 SD	6 N	6 MEAN	6 SD	7 N	7 MEAN	7 SD	8 N	8 MEAN	8 SD
4/89 PRE	0	0	0	49	22.9	12.9	124	27.3	10.4	62	31.1	7.9	52	31.0	6.5	33	30.5	7.8	0	0	0
4/90 POS	0	0	0	49	29.7	10.2	124	30.0	8.9	62	29.3	10.2	52	29.3	10.5	33	33.1	7.5	0	0	0
4/91 SE	0	0	0	49	29.2	11.6	124	38.8	12.0	62	32.4	12.5	52	32.9	12.2	33	32.8	7.2	0	0	0
POS-PRE[b]	0	0	0	49	6.8	11.7	124	2.7	11.9	62	-1.8	11.7	52	-1.7	10.3	33	2.5	9.1	0	0	0
SE-POS[b]	0	0	0	49	-0.5	12.5	124	8.8	13.4	62	3.1	14.6	52	3.5	12.8	33	-0.2	8.3	0	0	0
SE-PRE[b]	0	0	0	49	6.3	15.6	124	11.5	14.8	62	1.2	13.0	52	1.8	12.5	33	2.3	8.4	0	0	0

[a] PRE=Pretest, POS=Posttest, SE=Sustained Effect, POS-PRE=Posttest minus Pretest, SE-POS=Sustained Effect minus Posttest, SE-PRE=Sustained Effect minus Pretest

[b] Rounding caused some change values to differ from expected values.

Table 15

Sustained Effects Study
Area: Math-Basic (Total Math)
Group: **SERVED**
NCE Counts, Means and Standard Deviations
by Test Date and Change Values

1989-90 Grade

Testing[a] Points	2 N	2 MEAN	2 SD	3 N	3 MEAN	3 SD	4 N	4 MEAN	4 SD	5 N	5 MEAN	5 SD	6 N	6 MEAN	6 SD	7 N	7 MEAN	7 SD	8 N	8 MEAN	8 SD
4/89 PRE	0	0	0	8	19.0	11.6	8	21.3	14.6	19	29.9	8.0	9	25.0	11.3	8	29.6	8.3	0	0	0
4/90 POS	0	0	0	8	32.0	15.1	8	27.9	13.9	19	29.2	10.9	9	34.4	9.2	8	31.6	6.0	0	0	0
4/91 SE	0	0	0	8	34.3	15.2	8	32.8	8.8	19	25.5	12.0	9	37.3	7.7	8	32.0	7.5	0	0	0
POS-PRE[b]	0	0	0	8	13.0	17.4	8	6.6	12.5	19	-0.8	10.9	9	9.4	11.6	8	2.0	9.8	0	0	0
SE-POS[b]	0	0	0	8	2.3	17.6	8	4.9	9.5	19	-3.7	12.4	9	2.9	10.8	8	0.4.	8.1	0	0	0
SE-PRE[b]	0	0	0	8	15.3	16.8	8	11.5	13.7	19	-4.5	9.9	9	12.3	9.1	8	2.4.	9.5	0	0	0

Table 16

Sustained Effects Study
Area: Math-Basic (Total Math)
Group: **TOTAL**
NCE Counts, Means and Standard Deviations
by Test Date and Change Values

1989-90 Grade

Testing[a] Points	2 N	2 MEAN	2 SD	3 N	3 MEAN	3 SD	4 N	4 MEAN	4 SD	5 N	5 MEAN	5 SD	6 N	6 MEAN	6 SD	7 N	7 MEAN	7 SD	8 N	8 MEAN	8 SD
4/89 PRE	0	0	0	194	27.6	14.2	277	29.3	10.8	221	33.3	9.4	144	31.8	9.2	107	29.4	8.5	14	32.6	4.3
4/90 POS	0	0	0	194	46.5	16.2	277	37.8	12.5	221	41.9	14.8	144	40.8	14.7	107	41.9	12.2	14	36.6	[illegible].4
4/91 SE	0	0	0	194	37.0	12.7	277	38.2	12.3	221	35.8	12.7	144	37.3	12.9	107	34.1	11.3	14	26.6	[illegible].7
POS-PRE[b]	0	0	0	194	18.9	15.7	277	8.6	12.4	221	8.6	14.1	144	9.0	14.6	107	12.5	14.1	14	4.0	5.7
SE-POS[b]	0	0	0	194	-9.5	14.8	277	0.3	14.9	221	-6.0	14.3	144	-3.6	14.9	107	-7.7	13.7	14	-10.1	[illegible].0
SE-PRE[b]	0	0	0	194	-9.4	15.8	277	8.9	14.0	221	2.5	12.6	144	5.5	13.5	107	4.7	12.0	14	-6.1	11.7

[a] PRE=Pretest, POS=Posttest, SE=Sustained Effect, POS-PRE=Posttest minus Pretest, SE-POS=Sustained Effect minus Posttest, & SE-PRE=Sustained Effect minus Pretest

[b] Rounding caused some change values to differ from expected values.

Table 17

Sustained Effects Study
Area: Math-Advanced (Concepts and Applications)
Group: **EXITED**
NCE Counts, Means and Standard Deviations
by Test Date and Change Values

1989-90 Grade

Testing[a] Points	2			3			4			5			6			7			8		
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD
4/89 PRE	0	0	0	138	29.6	13.7	145	36.2	11.7	134	37.9	11.2	84	33.7	11.4	67	29.7	10.1	15	32.1	7.5
4/90 POS	0	0	0	138	48.7	12.6	145	43.9	10.3	134	44.7	11.7	84	44.1	11.3	67	48.1	11.6	15	33.7	7.8
4/91 SE	0	0	0	138	40.6	12.7	145	39.3	12.6	134	39.2	12.8	84	40.4	13.2	67	34.3	15.4	15	26.6	13.1
POS-PRE[b]	0	0	0	138	19.1	15.7	145	7.7	9.8	134	6.9	13.5	84	10.4	11.2	67	18.4	13.0	15	1.6	8.2
SE-POS[b]	0	0	0	138	-8.1	13.8	145	-4.6	11.4	134	-5.5	14.1	84	-3.7	14.1	67	-13.8	16.1	15	-7.1	14.9
SE-PRE[b]	0	0	0	138	11.0	16.9	145	3.0	12.4	134	1.4	13.3	84	6.7	13.2	67	4.6	15.6	15	-5.5	15.5

Table 18

Sustained Effects Study
Area: Math-Advanced (Concepts and Applications)
Group: **EVALUATION SAMPLE**
NCE Counts, Means and Standard Deviations
by Test Date and Change Values

1989-90 Grade

Testing[a] Points	2			3			4			5			6			7			8		
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD
4/89 PRE	0	0	0	49	25.8	13.5	126	32.1	9.3	62	36.8	7.9	52	31.0	7.4	32	31.1	8.8	0	0	0
4/90 POS	0	0	0	49	31.5	10.1	126	30.7	9.6	62	27.9	10.8	52	28.1	10.4	32	36.5	9.1	0	0	0
4/91 SE	0	0	0	49	31.0	11.5	126	36.6	10.9	62	30.7	11.6	52	33.0	14.9	32	30.6	9.1	0	0	0
POS-PRE[b]	0	0	0	49	5.7	15.0	126	-1.4	10.9	62	-8.9	12.5	52	-2.9	9.0	32	5.4	10.3	0	0	0
SE-POS[b]	0	0	0	49	-0.4	11.9	126	5.9	12.8	62	2.9	13.8	52	4.9	15.0	32	-5.9	11.8	0	0	0
SE-PRE[b]	0	0	0	49	5.3	15.9	126	4.5	13.7	62	-6.1	10.5	52	2.0	15.2	32	-0.5	9.7	0	0	0

[a] PRE=Pretest, POS=Posttest, SE=Sustained Effect, POS-PRE=Posttest minus Pretest, SE-POS=Sustained Effect minus Posttest, SE-PRE=Sustained Effect minus Pretest

[b] Rounding caused some change values to differ from expected values.

Table 19

Sustained Effects Study
Area: Math-Advanced (Concepts and Applications)
Group: **SERVED**
NCE Counts, Means and Standard Deviations
by Test Date and Change Values

1989-90 Grade

Testing[a] Points	2			3			4			5			6			7			8		
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD
4/89 PRE	0	0	0	7	26.1	7.9	8	32.6	11.1	19	34.5	8.5	9	24.8	9.8	7	24.1	8.2	0	0	0
4/90 POS	0	0	0	7	42.3	14.2	8	31.9	16.6	19	27.8	10.9	9	30.8	10.5	7	25.6	10.5	0	0	0
4/91 SE	0	0	0	7	40.7	13.9	8	36.4	6.0	19	24.3	11.4	9	36.4	8.0	7	29.1	5.3	0	0	0
POS-PRE[b]	0	0	0	7	16.1	14.3	8	-0.8	8.5	19	-6.7	12.5	9	6.0	11.6	7	1.4	15.4	0	0	0
SE-POS[b]	0	0	0	7	-1.6	16.7	8	4.5	13.3	19	-3.5	13.8	9	5.7	11.6	7	3.6	10.7	0	0	0
SE-PRE[b]	0	0	0	7	14.6	12.9	8	3.8	8.9	19	-10.2	9.4	9	11.7	9.1	7	5.0	13.0	0	0	0

Table 20

Sustained Effects Study
Area: Math-Advanced (Concepts and Applications)
Group: **TOTAL**
NCE Counts, Means and Standard Deviations
by Test Date and Change Values

1989-90 Grade

Testing[a] Points	2			3			4			5			6			7			8		
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD
4/89 PRE	0	0	0	194	28.5	13.6	279	34.3	10.8	215	37.3	10.1	145	32.2	10.2	106	29.8	9.7	15	32.1	7.5
4/90 POS	0	0	0	194	44.1	14.1	279	37.6	12.1	215	38.4	14.0	145	37.5	13.3	106	43.1	12.8	15	33.7	7.8
4/91 SE	0	0	0	194	38.2	13.1	279	38.0	11.8	215	35.5	13.3	145	37.5	14.0	106	32.8	13.4	15	26.6	13.1
POS-PRE[b]	0	0	0	194	15.6	16.4	279	3.4	11.2	215	1.1	15.0	145	5.4	12.1	106	13.3	14.0	15	1.6	8.2
SE-POS[b]	0	0	0	194	-5.9	13.8	279	0.4	13.2	215	-2.9	14.4	145	-0.0	14.9	106	-10.3	15.4	15	-7.1	14.9
SE-PRE[b]	0	0	0	194	9.7	16.7	279	3.7	12.9	215	-1.8	12.9	145	5.3	14.0	106	3.1	14.0	15	-5.5	15.5

[a] PRE=Pretest, POS=Posttest, SE=Sustained Effect, POS-PRE=Posttest minus Pretest, SE-POS=Sustained Effect minus Posttest, SE-PRE=Sustained Effect minus Pretest

[b] Rounding caused some change values to differ from expected values.

Table 21

Sustained Effects Study
Treatment Change Analysis[a]

Study Group	N	4/90 Posttest	4/89 Pretest	Change[b]
EXITRB	1,177	43.13	32.39	10.74
EVSAMPRB	497	29.62	30.10	-0.48
SERVEDRB	482	28.98	29.15	-0.17
TOTALRB	2,156	36.85	31.14	5.71
EXITRA	1,103	44.62	31.68	12.94
EVSAMPRA	456	31.53	31.00	0.53
SERVEDRA	501	31.22	30.21	1.01
TOTALRA	2,060	38.46	31.18	7.29
EXITMB	585	48.60	31.79	16.81
EVSAMPMB	320	30.01	28.30	1.71
SERVEDMB	52	30.69	26.02	4.67
TOTALMB	957	41.41	30.31	11.10
EXITMA	583	45.47	33.82	11.65
EVSAMPMA	321	30.45	31.76	-1.31
SERVEDMA	50	30.70	29.82	0.88
TOTALMA	954	39.64	32.92	6.72

[a] 4/90 Posttest Mean minus 4/89 Pretest Mean.
[b] Rounding caused some change values to differ from expected values.

Table 22

Sustained Effects Study
Short-Term Sustained Effect Change Analysis[a]

Study Group	N	4/91 SE Test	4/90 Posttest	Change[b]
EXITRB	1,177	39.77	43.13	-3.36
EVSAMPRB	497	32.56	29.62	2.94
SERVEDRB	482	32.29	28.98	3.30
TOTALRB	2,156	36.44	36.85	-0.42
EXITRA	1,103	40.56	44.62	-4.06
EVSAMPRA	456	34.05	31.53	2.52
SERVEDRA	501	34.28	31.22	3.06
TOTALRA	2,060	37.59	38.46	-0.87
EXITMB	585	38.32	48.60	-10.28
EVSAMPMB	320	34.48	30.01	4.47
SERVEDMB	52	31.00	30.69	0.31
TOTALMB	957	36.64	41.41	-4.77
EXITMA	583	38.89	45.47	-6.63
EVSAMPMA	321	33.43	30.45	2.98
SERVEDMA	50	31.40	30.70	0.70
TOTALMA	954	36.63	39.64	-3.01

a 4/91 Sustained Effect Mean minus 4/90 Posttest Mean.
b Rounding caused some change values to differ from expected values.

Table 23

Sustained Effects Study
Long-Term Sustained Effect Change Analysis[a]

Study Group	N	4/91 SE Test	4/89 Pretest	Change[b]
EXITRB	1,177	39.77	32.39	7.38
EVSAMPRB	497	32.56	30.10	2.46
SERVEDRB	482	32.29	29.15	3.14
TOTALRB	2,156	36.44	31.14	5.30
EXITRA	1,103	40.56	31.68	8.88
EVSAMPRA	456	34.05	31.00	3.05
SERVEDRA	501	34.28	30.21	4.07
TOTALRA	2,060	37.59	31.18	6.42
EXITMB	585	38.32	31.79	6.54
EVSAMPMB	320	34.48	28.30	6.18
SERVEDMB	52	31.00	26.02	4.98
TOTALMB	957	36.64	30.31	6.33
EXITMA	583	38.84	33.82	5.02
EVSAMPMA	321	33.43	31.76	1.67
SERVEDMA	50	31.40	29.82	1.58
TOTALMA	954	36.63	32.92	3.71

a 4/91 Sustained Effect Mean minus 4/89 Pretest Mean.
b Rounding caused some change values to differ from expected values.

Table 24

Sustained Effects Study
Individual Pupil Change
Percent Greater Than Zero[a]

Study Group	Posttest minus Pretest	Sustained Effect minus Posttest	Sustained Effect minus Pretest
EXITRB	85.6	35.3	70.6
EVSAMPRB	43.1	60.4	54.5
SERVEDRB	45.0	62.2	59.8
TOTALRB	66.7	47.1	64.5
EXITRA	87.2	34.9	72.7
EVSAMPRA	45.2	58.1	57.2
SERVEDRA	50.3	60.1	60.7
TOTALRA	68.9	46.2	66.4
EXITMB	92.6	19.7	68.5
EVSAMPMB	53.4	62.8	67.2
SERVEDMB	63.5	53.8	65.4
TOTALMB	78.0	35.9	67.9
EXITMA	82.7	28.5	64.3
EVSAMPMA	42.7	57.3	54.8
SERVEDMA	50.0	48.0	50.0
TOTALMA	67.5	39.2	60.4

[a] The proportion of the group with a positive change value.

References

CTB/McGraw-Hill Staffwriters. Comprehensive Tests of Basic Skills. Monterey, CA: CTB/McGraw-Hill, 1981.

The Psychological Corporation. Metropolitan Achievement Tests-Survey Battery (6th. ed.). San Antonio, TX: The Psychological Corporation, 1985.